JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES

VOL. 45. No. 15 — 13 JUNE 1938

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From a pencil sketch by Sir Robert Smirke—one of his preliminary designs for the competition held in 1817 for a National Memorial to commemorate the Napoleonic wars. This drawing, which is one among many beautiful sketches for this and other National Memorial schemes, is from the collection of Smirke drawings and letters given to the R.I.B.A. Library recently by Mrs. Biggar ; it shows a colossal obelisk at the northern head of Waterloo Bridge. Other proposals made by Smirke were for a triumphal archway and colonnade between St. James's Park and the Green Park, for a mausoleum either at Charing Cross or in St. James's Park and for a tall tower. The competition award was divided, Robert Smirke being allotted the Naval Memorial at Greenwich, Wilkins the Military Memorial proposed to be at the end of Portland Place, next to Regent's Park. Neither of these designs was carried out and the Memorial scheme ended in a series of makeshifts and compromises. Trafalgar Square was laid out, but not until a decade later, when both Wilkins and Smirke had their share in its buildings ; Waterloo Bridge, built speculatively, was adopted unofficially as a National Memorial and of the grand schemes to which the competition might have given birth nothing remains but Smirke's imaginative sketches

JOURNAL OF THE
ROYAL INSTITUTE *of* BRITISH ARCHITECTS

VOL. 45. 3RD SERIES 13 JUNE 1938 No. 15

Journal

NATIONAL PLAN

There have been many statements made in favour of the formation of a national planning authority, statements conceived in a multitude of different forms, according to the particular national circumstances at the time and the particular outlooks of the proposers. The R.I.B.A. itself has frequently been the platform for the statement of the case for a centralised national planning authority, and the R.I.B.A. on that account can welcome wholeheartedly the valuable Report of the National Survey and National Planning Committee of the Town Planning Institute.

The report throughout deals with England and Wales only, though its conclusions should, it is stated, be applicable to Scottish planning too. It is divided into three parts, dealing in turn with the history and present position of planning, the need for national planning and, finally, with the National Planning Commission which is proposed as the committee's conclusion. The first part is probably the shortest and clearest summary of the history of British planning that has yet been published ; it is at the same time highly critical and points out in definite terms the serious gap between resolutions to plan (so easily made) and the actual achievement. The Town and Country Planning Act 1932 gave such a stimulus to the *idea* of planning that the number of acres covered by resolutions to plan rose from 9,384,000 in 1933 to 22,552,000 in 1937, nearly two-thirds of the land surface of England and Wales. Unfortunately the completion of schemes has been quite disproportionately slow. It is "disappointing and unsatisfactory," the report declares, that by 31 December 1937 only 237,500 acres had been covered by finally approved schemes. Schemes submitted to but not yet approved by the Minister covered 2,394,500 acres and draft schemes covered a further 2,579,400 acres. The historical chapter ends with the statement of four salient characteristics of planning : (*a*) it is slow and complicated, (*b*) it has throughout its history in this country been regarded as a *local* activity performed by local authorities, (*c*) planning areas vary widely in size and are distributed by accident rather than foresight, (*d*) that while regional needs have to some extent been met by the use of joint committees the *national* aspects of planning have no place in law and have had little attention in planning practice.

A detached observer might ask could ineptitude go further ? We elaborate ("elaborate" is the right word) a structure of law and practice which is some sort of token at least that at various times we have had a wish to plan, and yet we leave the whole organisation in such a way that a large part of the country is hardly any further towards being planned, even according to the existing inadequate legal definitions, six years after the passage of the Act than it was in 1932. Who cares ? Does Parliament care ? or the architectural profession or the general public or local authorities ? —and even if some parts of the community do care, can they do anything ?

The second part of the report suggests, by a critical analysis of needs, what can be done. These needs are such that they cannot be met by the Minister of Health (whose powers are limited by his quasi-judicial functions under the Planning Act) or by any other existing body. What is wanted is a body capable of preparing the ground for a national plan by making a national survey, then, the survey completed, framing the plan or policy itself, on broad and flexible lines, for the allocation and distribution of major land uses "in an economic, healthy, convenient and seemly manner, satisfying as fully and as fairly as possible the legitimate interests, needs and aspirations of every kind of user." The new body must also during the progress of planning be in a position to advise and co-ordinate the work of Government departments, statutory undertakers, highway authorities and local authorities, and watch every detail of progress with a view to the modification of law and regulations to meet changing conditions. To do all this a National Planning Commission, consisting of a full-time chairman and not more than six other commissioners, with a staff of a deputy-commissioner

and from six to nine divisional officers, is proposed. The commission would be as free as possible and would have power to make its views effectively known but would be responsible to some Cabinet Minister.

The case for a commission has now been stated and it deserves the very closest attention. Whatever form of central government there may be, it would seem desirable to have a free body such as a commission to conduct the survey and be able to respond more keenly to the technical issues than a crowd of politicians. But one does not need to be a cynic to doubt whether Parliament would now consent to measures which in order to be effective would involve of necessity serious infringement of the rights of personal property holders, and which would require not only speculative expenditure in the conduct of the survey but continued expenditure in the operation of a plan at a time when Parliament has to concentrate national funds on preparations for a war which, if it comes, will make any national plan in the terms of this examination look silly. But gloomy forebodings do not absolve us from responsibility and we must remember that the influence of such a proposal as this depends entirely on the amount of general support it receives.

Tours and Visits at the Bristol Conference

It may not be easy for members who do not know the country round Bristol to choose the tours and visits they would like at the coming conference. With this in mind the President of the Wessex Society has sent some notes on the conference programme. The informal reception is to be held at the Red Lodge, a Tudor house with a most interesting collection of treasures. At the Civic Reception at the Art Gallery and Museums, besides the usual exhibits, the R.I.B.A. Health, Sport and Fitness Exhibition will be on show, there will be a film called "The City of a Thousand Years" and a dance.

Visits will be made to Bath (guides: Mr. Mowbray Green [*F.*], Mr. A. C. Fare [*A.*] and Mr. A. J. Taylor [*F.*]), historic Bristol (Mr. C. F.W. Dening [*F.*]), Regency and modern architecture in Clifton (Mr. G. D. Gordon Hake [*F.*]) and to the Wills' tobacco factory (Mr. J. Ralph Edwards [*F.*]).

The Wessex province embraces the counties of Gloucestershire, Somerest, Wiltshire and Dorset. From this *embarras de richesse* the Society have arranged the following tours:—to the Cotswolds (guides: Mr. H. Stratton Davis [*F.*] and Mr. H. F. Trew [*F.*]); to the western area of the province as far as the fringe of Exmoor—through the Mendips and the Quantocks (guides: Mr. W. J. Stenner [*F.*] and Mr. R. S. Redwood [*A.*]). Tour No. 3 concentrates on the Mendip country and the guides will be Mr. G. D. Gordon Hake [*F.*] and Mr. Hartland Thomas [*F.*]. The route will be Dundry Hill, Blagdon Lake, Barrington Combe, Chewton Mendip (the very names are enticing), Cheddar Gorge, Glastonbury Abbey, Wells and back again by another road through Dundry. Tour No. 4 is through East Somerset and part of Wiltshire. Mr. R. W. H. Vallis [*A.*] will be the guide.

Peter Behrens

One of the most distinguished of R.I.B.A. Honorary Corresponding Members, Professor Peter Behrens celebrated his seventieth birthday on 14 April. However much the paternity of whatever is called "modern" may be disputed there is agreement everywhere about the superlative quality of Behrens' contribution. His first building—a house for himself in the once-famous "Künstlerkolonie" at Darmstadt dates from 1901. In 1903 he was made director of the Düsseldorf School of Arts and Crafts. Four years later he was appointed "controller of design" to the A.E.G., the great German electrical company. This was the decisive event in his life. The following year he built his Turbine-Erecting Shop in Berlin for this company, which is generally regarded as the first definite prototype of modern industrial architecture. The Administrative Building of the Mannesmann Tube Company in Düsseldorf (1911) was similarly the first example of a modern office block with rooms of standardised dimensions, construction and equipment. The next year Behrens exhibited some standardised furniture for workmen's dwellings besides building the new German Embassy in St. Petersburg. During the war he built workmen's *Siedlungen* in Berlin with refuse clinker blocks. After the war he built Administrative Headquarters for the German Dye Trust at Höchst (1920) and the Gutehoffnungshütte Steelworks (1921), Mr. Bassett-Lowke's house "New Ways," at Northampton (1925), the St. Peter's Monastery, Salzburg (1924), Vienna municipal housing blocks (1924), and his famous modern house in the Taunus Mountains. He was the only architect of the older generation who participated in the Stuttgart Housing Exhibition of 1927.

In 1922 he was appointed Rector of the Vienna Academy of Fine Arts in succession to Otto Wagner, and two years ago was called to Berlin to become head of the Prussian Academy's Architectural School. At present he is occupied with the design of the new German Embassy in Washington. Prolific as Behrens has been as a designer of things as diverse as housing colonies and factories, bridges, church vestments, letter-boxes for the German post office, porcelain, underground stations, and a new type-founts, he attaches most importance to his "Terrassenhaus" project (1920) for blocks of flats, giving each floor its own roof garden. This, though never carried out, profoundly influenced post-war housing design throughout Europe.

A presumed portrait of Hugh Herland in a window in Winchester College Chapel

THE MEDIAEVAL CARPENTER AND HIS WORK AS AN ARCHITECT

By JOHN H. HARVEY

The view that the architects of the Middle Ages were clerics, and often highly placed churchmen, was exploded a good many years ago, and it is now generally admitted that the place of the architect was supplied by the master-craftsman. But it so happens that while the names and careers of many of the great mason-architects have been revealed by recent research (1) comparatively little has been published on the careers of the men who were, even more than the masons, responsible for the creation of English traditional architecture, the art of building the house and the hall.

To a very large extent these were works of carpentry rather than masonry, and it is significant that while every manor had its carpenter from the earliest recorded times the development of the mason's craft was separate and not in the same manner interwoven with the life of the people.(2) It is interesting to see that even as late as the middle of the fourteenth century the King's Household contained a far greater number of carpenters than masons; in 1344 there were 138 of the former to only 24 of the latter,(3) a very striking disproportion when we consider that the day of the timber palisade in fortification had gone by.

The history of the master masons of the past has been greatly elucidated through the interest of modern Freemasons in their operative predecessors, and the part taken by the carpenter in architectural development has been overshadowed.

(1) See especially: W. R. Lethaby, *Westminster Abbey and the King's Craftsmen*, 1906, and *Westminster Abbey Re-examined*, 1925; D. Knoop and G. P. Jones, *An Introduction to Freemasonry*, 1937; W. J. Williams, *The King's Master Masons*, and *Masons of the City of London* in *Ars Quatuor Coronatorum*, Vols. XLIII and XLV; D. Knoop and G. P. Jones in *Miscellanea Latomorum*, November 1937.

(2) For the history of carpentry in England, see S. O. Addy, *The Evolution of the English House*; the very valuable *Development of English Building Construction*, by C. F. Innocent, in particular Chapter VIII, "The Carpenter"; M. S. Briggs, *A Short History of the Building Crafts*.

(3) *Ordinances for . . . the Royal Household* (Soc. of Antiquaries), 1790, p. 4.

Before the Norman Conquest, buildings of timber were the general rule, and masons' work was rather exceptional. A number of stone-built churches of Saxon date survive, and many must have perished, but it is clear that the Saxon masons modelled their construction and detail to a large extent on those of timber buildings.

The thesis that the architecture of Northern Europe owes much to the habitual use of timber has been developed by Professor Strzygowski, who shows that the few half-timbered churches still existing in England are to be considered rather as the legacy of an ancient timber tradition than copies from masonry models, as has usually been suggested.(4)

Owing to its perishable nature the bulk of Saxon construction has disappeared, but we still have the wooden walls of Greenstead Church, and sufficient evidence in the form of illuminations in manuscripts, the Bayeux Tapestry and literary references to show that the carpenter of Anglo-Saxon England must have been the nearest equivalent to the architect of to-day. He was the "wright" (O.E. wyrhta) par excellence, while other craftsmen who wrought various implements of less importance than the house were distinguished by the prefix signifying their trade, as wheelwright and ploughwright.

We know little of the details of Saxon building construction, but presumably it was not unlike that of the earlier Middle Ages which still survives. Houses of more than one storey were built, as we know from a reference in the *Anglo-Saxon Chronicle*. The Witan had met in an upper room of a house at Calne in Wiltshire in 978, when the floor gave way ; all the august members fell through except the holy Dunstan, who saved himself on a beam.(5) One can picture a floor of a very usual mediæval type, divided into two spans for joists by a central beam, above one end of which St. Dunstan must have been sitting, probably in a presidential chair against the wall.

Apart from general references, little transpires as to the status of the carpenter until the great series of Pipe Rolls begins in the mid-twelfth century.

We soon find mentions of the King's carpenters, and in some instances the same man (apparently) is elsewhere referred to as an "engineer" (ingeniator). This use of the name engineer is almost always in conjunction with military works at Royal castles, such as the Tower, and implied familiarity with the construction of engines of war, the wooden balistas and mangonels which preceded the invention of gunpowder.

The engineer was also an expert in the art of fortification, doubtless a heritage from the Saxon and Norman type of timber palisaded fortress which still existed into the thirteenth century, although stone was fast taking the place of wood.

The first of these engineers who appears by name is Alnoth or Ailnoth, who was taking 7d. per day between 1173 and 1187,(6) a sum perhaps equal to 15s. or £1 a day now, and as he drew pay for every day, Sundays and feasts included, he was a £300 to £400 a year man. Compared with the cost of living which was then normal, such a salary indicates that Master Ailnoth was a highly skilled and respected artizan, and quite a close counterpart of the modern professional man.

At the Tower of London, then the chief Royal Residence, no chief craftsman is mentioned by name from 1187 until 1194, when one Elyas first appears as the King's engineer.

Both Ailnoth and Elyas were among the viewers or surveyors of the works ; all through the history of the ancient Office of Works there is a dual tendency observable in the appointment of surveyors. At first they were clerics or other Royal officials entrusted with the expenditure of the money for the necessary works and repairs ; then craftsmen such as Ailnoth were associated with them, to act as quantity surveyors, measuring the amounts of work done and keeping a check on the quality of the work.

During the fifteenth century this practice was on the wane, and the surveyor and clerk of the King's Works was usually a cleric, not a technical man. In spite of a few reversions to the craftsman-surveyor,(7) it became usual as time went on for this office, which had become that of Surveyor-General, to be held by men who had administrative ability and often artistic knowledge, but who had not graduated through one of the building crafts. Sir Christopher Wren is, of course, a case in point.

Elyas was in charge of the works at the Tower of London at the time when parts of the earlier timber palisades were being replaced by stone walls. The foundations of the Bell Tower and probably of much of the inner curtain may well be work done under his supervision.

Meanwhile, the local carpenters of manors throughout the country were putting up small wattle-and-daub cottages on timber framing, often on crucks, and at the orders of their lords were erecting houses with a great hall and a few subsidiary chambers.(8) The great abundance of excellent building timber in mediæval England made timber-framed construction by far the most economic for most districts, and as the tumultuous days of the Norman kings receded into the distance, fortification for the house became less important.

(4) Josef Strzygowski, *Origin of Christian Church Art*, 1923, pp. 78ff. and 243 ; *Early Church Art in Northern Europe*, 1928, pp. 77-116.

(5) "*Anglo-Saxon*" *Chronicle, sub anno* 978.

(6) *Calendars of Great Rolls of the Pipe, passim.*

(7) e.g., James Nedeham in 1533.

(8) see works cited in note (2).

Wherever long series of manorial accounts have been preserved, it is noteworthy that at least minor repairs to the "Great House" were constantly going on, in almost every year. The village carpenter originally had to perform a certain number of days' service for the lord during the year, but in the period for which documentary evidence exists wages were paid to the craftsman for his work on the great house and other buildings. But no manorial accounts of the twelfth century survive, and by the middle of the thirteenth the old customs were changing.

The fact remains, however, that there was a local carpenter available at each of the King's manors, and if he showed unusual capacity he might get promotion. The names of carpenters well known in London would be brought to the King's ears if he contemplated extensive building works there, and the practice of impressing craftsmen into the King's service from all over the country opened a channel for further talent.(9)

In addition to all this coming and going of craftsmen, there was a constant exchange of men between the big ecclesiastical centres and cathedral cities and London.(10) London men who had gained some repute were invited to become advisors or "diocesan" craftsmen to Bishops and others who may in their earlier days have been clerks employed on the Royal works.

It is, for instance, an ascertained fact that William of Wykeham, while clerk of the works at Windsor Castle in 1356-1361, came in touch with the mason William Wynford, who for some years worked as one of the King's chief masons.(11) In later years he designed for Wykeham the new college at Winchester (1388-1393)(12) and the new work of the cathedral (1393 onwards).(13) The accounts of the Bishop's manor of Highclere show that in 1394 he was supervising new works there as well.(14)

A parallel case of a carpenter is that of Hugh Herland, whose father had worked at Windsor in 1350-1, and later under Wykeham in 1357(15); Hugh was probably himself well known to the great churchman. Herland was his father's chief assistant on the wooden stalls and vault of St. Stephen's Chapel at Westminster(16); then on his father's death in 1375 he succeeded to the latter's post of King's Chief Carpenter.(17) From 1378-1387 he was Chief Carpenter and Controller of Works at Rochester and Leeds Castles, in Kent, (18), and in 1387 he was also working for Bishop Wykeham at Highclere.(19) It is practically certain that he was the designer of the great wooden vault of Winchester College Chapel, and of the remainder of the timber work at the College. In the stained glass of the east window of the Chapel is a figure of "The Carpenter," beside those of William Wynford, the mason, and Simon Membury, the Clerk of Works; it is reasonable to conclude that this is a portrait of Herland. He is shown kneeling in a rich robe, presumably the one he received every year from the Royal Wardrobe, as King's Master Carpenter.(20) (see headpiece)

In 1390 he had been appointed, with the two famous masons, Henry Yevele, and Wynford, to a commission for the repair of Winchester Castle,(21) so that he was able to combine his official duties there with work for Wykeham.

He is known to have lived at Kingston-on-Thames at this period, so that the "William Herland of Kingston, Surrey," one of the 70 original scholars of Winchester(22), was probably his son; this again is evidence of comparatively good social position; he was, in virtue of his office, an Esquire of the Royal Household.

(9) For impressment, see D. Knoop and G. P. Jones, *The Mediæval Mason*, and also many papers by the same authors in *Journal R.I.B.A.*, *Ars Quatuor Coronatorum*, and *Economic History*; I am greatly indebted to Professor Knoop for copies of many of these invaluable papers and other information.

(10) In a roll of accounts of works at the Tower of London, 1274-5, in the Public Record Office (E. 101/467/6(4)) the following toponymical surnames occur in a list of 30 carpenters, tilers and plasterers: de St. Albans, Merton, Oxon (Oxford), Redinge (Reading), Exon (Exeter), Norwig' (Norwich), St. Edmunds; seven towns containing important ecclesiastical buildings.

(11) Sir W. H. St. J. Hope, *Windsor Castle*, i, p. 218.

(12) His portrait appears in the stained glass of the East window of the Chapel, with those of the carpenter and Simon de Membury, the clerk of works; Wynford, Membury, and the famous King's Carpenter, Hugh Herland, all dined together with Bishop Wykeham on a number of occasions in 1393, when the College was nearing completion. For this most interesting information I am deeply indebted to Mr. Herbert Chitty, F.S.A., who discovered them among the lists of guests' names appended to the daily statements of meals served in the unique Household Account Roll for 1393 now preserved at Winchester College.

(13) A. F. Leach, in *Encyclopædia Britannica*, 13th ed., article William of Wykeham.

(14) J. Harvey Bloom in *Genealogists' Magazine*, Vol. 7, 1936, p. 340; Mr. Bloom also very generously allowed me to make extracts from his unpublished translations of these most interesting rolls, which are now in the Public Record Office; Eccl. 2/159375-159406.

(15) W. H. St. J. Hope, *Windsor Castle*, Vol i, pp. 131, 179.

(16) *Calendar of Patent Rolls*, Aug. 16, 1360; and P.R.O. Accounts, E.101/472/16.

(17) *Calendar of Patent Rolls*, 10 June 1375.

(18) Accounts in P.R.O., E.101/480/5, 8, 10, 12.

(19) P.R.O. Eccl. 2/159395, among Mr. Bloom's transcripts; see note (14) above.

(20) For further information on Herland, and reproduction of his presumed portrait, see W. & J. H. Harvey in *The Connoisseur*, June 1936, *Master Hugh Herland*; copies with additional notes and full references are in the British Museum, Guildhall, R.I.B.A., and Kingston-on-Thames Libraries. See also *The Builder*, 5 Mar. 1915, pp. 218-9; and F. B. Andrews, *The Herlands and other Carpenters*, in *Birmingham and Mid. Inst. Trans.*, 55 (1933), p. 30; the latter curiously confuses William Herland with his predecessor, William Hurley.

(21) *Calendar of Patent Rolls*, 3 Mar. 1390.

(22) Winchester College Register; information kindly sent by Mr. Herbert Chitty. William Herland was one of the scholars who entered the buildings on 28 Mar. 1394; he left (*recessit sponte*) three years later, on 9 Mar. 1396-7.

During 1393, Wykeham's roll of household accounts shows that Herland dined with the Bishop on a number of occasions, as did Wynford and Membury, often on the same night as Herland, so that we see the " client " keeping in close touch with his " architects ". (23)

No sooner was his work at Winchester College finished than Herland was appointed by the King Carpenter and Controller for the new work at Westminster Hall.(24) The work of erecting the great roof, which still stands to-day, lasted for the next six years, and was, it appears, the final work of importance undertaken by Hugh Herland ; on the merit of this single work he would claim a place among England's greatest architects, apart from the wonderful " fan vault in wood " at Winchester, and his other work of which we know little. His official salary and pensions at the height of his career amounted to £43 3s. 4d. per year.(25)

After the lapse of a century and a half, England produced another carpenter who ranked very high as an architect. Henry VIII, in 1531, appointed James Nedeham to the office of King's Chief Carpenter, at 12d. per day,(26) and two years later he was promoted Surveyor-General of the King's Works at 2s.(27). He is known to have prepared the drawings for the great hall roof of Hampton Court Palace, built between 1532 and 1536 ; for riding down to Hampton for this work he was paid 4s. a day " riding costs."(28) Ten years earlier Nedeham had been serving as a carpenter with the military at Calais.(28a)

Herland and Nedeham and a number of others were exceptionally brilliant men, but a noteworthy feature of the arts and crafts of the mediæval period is the great number of " little Masters." Thus, many different names are found, each responsible for excellent but minor works. Of course, the easily destructible nature of timber is responsible for the total loss of a large number of masterpieces, both great and small ; on the other hand, the timber roofs of East Anglian churches, though not at present ascribable to known hands, bear witness to the extraordinary excellence of English timber architecture, even in country parishes. It is probable that famous carpenters from London or the cathedral centres were called into consultation by the rich woolmen who endowed so many of these little cathedrals.

The evidence as to the fees of these consultants is not as full as one could wish, but they were probably high ; the specialist, then as now, commanded a good rate of pay. Hugh Herland was paid 6d. a day for going to Highclere for four days in 1387, and 10d. was allowed for 6 lbs. of oats for his horse, coming on divers occasions.(29) At the same time he was drawing £18 5s. per year in retaining fees (" pension ") as a Civil Servant(30) with £6 13s. 4d. per year from the fee-farm of Winchester for his work at Winchester Castle.(31) Master William de Hurle, of whom more later, was paid a retaining fee of £8 a year when " architect " for the great lantern above the octogon of Ely Cathedral, while at the same time he received £18 5s. a year as King's Chief Carpenter, with a robe every year, or 20 shillings for it.(32)

Wage rates for carpenters were usually the same as those for masons ; apart from differences in wage categories of craftsmen, there was at Royal Works a threefold division of conditions : labourers and partly skilled men drew pay only for the actual days worked, receiving no holidays with pay ; skilled men who were not on the staff of permanent officials were paid for about 15 of the principal feasts in the year in addition to their working time ; the pay for these two classes, who were paid weekly at a daily rate, seems to have been termed " stipendia " ; the third class consisted of master craftsmen on the staff, who took a daily rate of pay for 365 days in the year, regardless of Sundays and feasts ; salaries of this type were called " vadia."

The two former classes were normally out of work on a large number of compulsory holidays without pay ; in the fourteenth century at the Tower of London these unpaid holidays included four days at Christmas, Good Friday, and the weeks after Easter and Whitsun, as well as a number of Saints' Days throughout the year. In the case of those who were paid for certain feasts, not more than one paid feast was allowed in one week, though it often happened that there was no work done on two days in the week, for one only of which pay was granted. An account of works at the Tower of London in 1336-1338(33) is a useful source for wages and holidays ; it does not extend over a full two years, but runs from 29 April 1336 to 27 February 1338. (There are some later entries, but separated by a long gap of several months from the remainder of works in the account.) Unfortunately, there is no one craftsman whose name appears in every week, but Roger de

(23) Wykeham's Household Account Roll, 1 Mar.-30 Sep. 1393. Some extracts from the roll, supplied by Mr. Chitty, are included among the notes added to certain copies of the article mentioned in note (20).
(24) *Calendar of Patent Rolls*, 21 Jan. 1394.
(25) *Cal. Pat. Rolls*, 19 Nov. 1399.
(26) Patent, 24 Mar. 1531, in *Letters and Papers of Henry VIII*, Vol. 5, p. 104.
(27) *Letters and Papers of Henry VIII*, Vol. 6, p. 191.
(28) Bodleian *Rawlinson* MS. D.775, quoted in D. Knoop and G. P. Jones, *The Decline of the Mason-Architect in England*, in *Jnl. R.I.B.A.*, Vol. 44, No. 19 (1937) ; see also warrant of 29 Apr. 1544, in *Letters and Papers*, etc., Vol. 19, Pt. 1, p. 287. William Clement, who was chief Carpenter from 1532, and supervised the work at Hampton Court, has been usually credited with the design, but this can hardly be maintained in view of the documentary evidence that Nedeham made the drawings for the Hall.
(28a) *Letters and Papers of Henry VIII*, Vol. III, Pt. 2, 2587, 3288 (1522, 1523).
(29) P.R.O. Eccl. 2/159395, quoted from Mr. Bloom's transcript.
(30) *Cal. Pat. Rolls*, 7 Dec. 1383.
(31) *Cal. Pat. Rolls*, 28 Apr. 1391.
(32) F. R. Chapman, *Sacrist Rolls of Ely*, 1907, Vol. i, p. 44ff.
(33) Account in P.R.O. E.101/470/1.

Langele, a skilled carpenter, was at work from 9 September 1336 until the end of the account. From 29 April to 1 June John Adam, carpenter, was the principal craftsman—from 3 June to 13 July, Adam of London, carpenter; while from 15 July to 7 September the only comparable skilled man was Thomas de Bagworth, a mason. John Adam was paid 5d. a day, Thomas de Bagworth 5½d., and Roger de Langele 6d. These rates show that they were near the top of their crafts for the period, as only permanent officials drew rates such as 8d. or 12d. a day.

In 1336 the paid holidays, from 29 April to 31 December, were: Holy Cross, Ascension, St. John Baptist, St. James Apostle, St. Laurence, St. Bartholomew, Exaltation of Holy Cross, SS. Simon and Jude, St. Edmund King and Martyr, St. Andrew Apostle, St. Thomas Apostle. The unpaid holidays were: SS. Philip and James, St. John before the Latin Gate, Corpus Christi, St. Barnabas, SS. Peter and Paul, St. Margaret, St. Mary Magdalene, St. Peter ad Vincula, Assumption of the V.M., Decollation of St. John Baptist, St. Matthew Apostle, All Saints, All Souls, St. Martin, St. Katherine, St. Nicholas, Christmas and three days after; also the whole week after Whitsun.

In the complete year 1337, Roger de Langele took the following paid holidays: Epiphany, St. Peter Apostle, Annunciation of the V.M., Saturday on the eve of Easter, SS. Philip and James, St. John before the Latin Gate, Corpus Christi, Translation of St. Thomas, St. James Apostle, Assumption of the V.M., Nativity of the V.M., St. Luke Evangelist, All Saints, St. Edmund King and Martyr, St. Nicholas; while his unpaid holidays were: Circumcision, Conversion of St. Paul, St. Matthias Apostle, Good Friday, the whole week after Easter, Invention of Holy Cross, Ascension, the whole week after Whitsun, St. John Baptist, St. Mary Magdalene, St. Peter ad Vincula, Decollation of St. John Baptist, St. Michael, SS. Simon and Jude, St. Martin, St. Katherine, Conception of the V.M., Christmas, and three days after.

In the fragment of 1338 he was paid for one feast, Purification of the V.M., and had three unpaid holidays, Circumcision, Epiphany, and St. Matthew.

It is interesting to compare these holidays with those in force at a later period; two complete lists which have already been published are those for Eton College in 1444-1446,(34) and at the Tower, an especially useful comparison, in 1535-6.(35)

It is seen at once that in our 14th century lists the holidays were less standardised; in the year 1337 a total of 46 holidays was kept, but 5 of these did not occur in a composite calendar made up of 1336 and 1338 and amounting to about 10 months of the year. On the other hand, this composite calendar contains 11 holidays which were not kept in 1337; these figures are quite irrespective of feasts falling on Sundays, as in every case where feasts kept as holidays fell on Sundays, there is a note in the account that they were kept on the Monday, or in one case, the Saturday.

Secondly, the later periods show that pay was granted for a much greater number of holidays: out of the 46 days in 1337 on which no work was done, pay was given for only 15, namely for 13 fixed feasts, with Saturday on the eve of Easter, and Corpus Christi, while at Eton in 1445-6, 34 out of a total of 43 days were paid, and at the Tower in 1535-6, 27 out of 51. It is probable that many of the extra paid feasts granted at Eton were a special concession to the freemasons, as the hardhewers and layers there were only paid for a very small number of holidays. But as far as our Tower accounts are concerned, when skilled masons were at work at the same time as the carpenters, they received the same paid and unpaid holidays.

Another point on which some light is thrown by this account is that of half-holidays. It has been suggested, on rather equivocal evidence, that in the 14th century there was a half-holiday on Saturday, with a full day's pay.(36) This was certainly not the case at the Tower in 1336, for while in normal weeks Saturday counted as a full-pay day, and where an unpaid feast fell on a Saturday a whole day's pay was lost, there are several specific cases where mention is made of Saturday work having been until noon, and on each occasion a half-day's pay only was allowed. Thus, in the week ending 27 April 1336, labourers were paid for 2½ days' work, for Wednesday, Friday, and Saturday till noon; Robert de Chichestr', carpenter, drew 1½ days' pay for working on Friday, 10 May and Saturday 11, till noon; and William of Corfe, mason (cementar') worked on the Friday and Saturday (14 and 15 June) "viz., for 1½ days, taking for a day 5d. and for half a day 2½d.—7½d."

This seems to show quite clearly that on Royal works in the early 14th century it was not the practice to grant a paid half-holiday on Saturday, but that both skilled and unskilled labourers were occasionally permitted to take Saturday afternoon as unpaid leave.

The total of paid holidays in 1337 was 15, and of unpaid, 31; presumably Roger de Langele was able to do shop work on his own behalf, or undertake small contracts, on his holidays, to increase his income.

His surname suggests that he had been a carpenter at the King's manor of Chilternlangley (now King's Langley), Herts.; in the latter part of 1337 a Hugh de Langele appears as an assistant to the carpenters, at 2½d. a day, and from 2 February 1338 his wages were increased to 3d. a day—it is very likely that he was Roger's son. Crafts ran in families, and the same

(34) D. Knoop and G. P. Jones, *The Building of Eton College*, in *Ars Quatuor Coronatorum*, Vol. xlvi, pp. 70-114.

(35) D. Knoop and G. P. Jones, *The Sixteenth Century Mason* (from *Ars Quatuor Coronatorum*, 1937).

(36) D. Knoop and G. P. Jones, *The Mediæval Mason*, 1933, pp. 120-1.

surname is often found among the King's masons or carpenters for a century ; in some cases there is positive evidence of relationship, in others it must be presumed from the circumstances. The practice of a young man working for his father or some other skilled craftsman as labourer or " mate " (socius, famulus, serviens) seems to have been a normal training before the system of articled apprentices was in existence.

Quite apart from the hierarchy of wages and conditions within each craft, there was an aristocracy among the various crafts themselves ; when the skilled masons and carpenters drew pay for certain holidays, so also did the smiths, but the tilers, plasterers and sawyers did not—their work was evidently considered too closely akin to mere labour.

The design of the minor works executed by these carpenters probably fell within their competence as craftsmen ; such works were the making of a new drawbridge by Adam de London, and various alterations to rooms and buildings in the Palace of the Tower, by Roger de Langele. When a major work was undertaken, special appointments were often made, as for the new work at Westminster Hall in 1394, or in other cases one of the chief craftsmen is found in the accounts for a part of the time.

Examples of routine carpentry work for a private client at the same period are found in the accounts of Laughton, Sussex(37) which include expenses on the buildings of Laughton Place. In 1339 a carpenter was paid 10½d. for three days' work on mending " 1 panel of a wall of the great room behind the hall, 1 panel for another repair to the wall of the room on the south side of the hall, and 1 panel of the stable wall outside the gate of the hall." The same or another carpenter was paid 5¼d. for working 1½ days on making a new wall on the north-east end of the " gathous " with one new window there.(38)

In a roll of 1340-1, 12d. wages is paid to a carpenter working four days on mending the gate outside the door of the hall and making three new doors in various houses, and mending the " benchys in the hall against the coming of the lord."(39) A roll of 1372-3 mentions " a carpenter hired to mend various doors in the lord's chamber, and also to cover over the said chamber with shingles." He worked for one day, and was paid 4d. ; (40) the standard rate for carpenters at the end of Edward III's reign in these Sussex rolls is ½d. dearer than in those of forty years before, an example of the effects of the Black Death.

(37) British Museum, *Additional Charters* 32, 134-32, 142 (1336-41, 1352, 1372-76) ; these are part of the Pelham Papers. In the same collection there is also a magnificent series of the 15th and 16th century accounts for Laughton : *Add. Ch.* 32, 133, 32, 143-32, 358 (1407-1570) ; from Henry V to Henry VII inclusive the series is practically complete.
(38) B.M., *Add. Ch.* 32,135.
(39) B.M., *Add. Ch.* 32, 137.
(40) B.M., *Add. Ch.* 32, 139.

In the next century at Southchurch Manor, near Southend in Essex, John Londoneys, a carpenter, worked for six days on the granary in 1436, taking 6d. a day, and in the next year spent two days " in placing a piece of timber called ' Besonpece ' in the Kitchen of the manor." This work was done for the prior of the cathedral at Canterbury, as Christ Church Priory were lords of the manor of Southchurch.(41)

In contrast to these jobbing works of the countryside are the great architectural works of the same period, carried out for the Crown and for ecclesiastical patrons.

The masonry of the great octagon at Ely had been begun in 1322, and was completed by about 1328 ; then came the wonderful crowning feature, the timber-built lantern. The designer was Master William de Hurle (or Horlee),(42) who was at the same time King's Chief Carpenter, and principal carpenter for the work on St. Stephen's Chapel, Westminster.(43) His work at Ely lasted from before 1334 until his death in 1354, his position being entirely that of a consultant ; he was fully employed during the whole period as a Civil Servant, working at Westminster, Windsor

(41) Accounts among the archives at Canterbury and Lambeth, quoted in a local (probably Southend) newspaper cutting, kindly lent me by my friend Mr. H. A. James, who informs me that though undated it was sent him about ten years ago ; this agrees with the date of the restoration of the hall, mentioned in the cutting (1928-1930). Many other items of interest are included, as the whole of the repairs items for 1436 and 1437 are quoted in translation. Some interesting items are : " 500 laths bought in London . . . with carriage 4s. 8d. ; 12,000 tiles bought at ' Hundersle ' (Thundersley), at 4s. the thousand ; 3,000 laths bought in London at 6s. 8d. the thousand, . . . carriage of the same, 3s. ; 13,000 lathnails bought at Faversham (across the Thames estuary) at 15d. the thousand ; nails bought at ' Pritewell ' (Prittlewell) for the ' eveslathes,' 2d. ; 6½ bushels of ' tylepynnes ' bought of John Sibbe at 8d. the bushel (Sibbe also appears in the account as a mason, taking for himself and an assistant 10d. a day, but the actual work he did consisted of plastering (' daubing ') and laying tiles ; he is called ' tyler ' in the 1437 account) ; John Sibbe for laying 4,000 tiles . . . 4s. 4d. ; for laying 26,000 tiles at 13d. the thousand . . . ; John Sibbe and his assistant for one day's work in laying tiles . . . 10d. (from these items it appears that tiles cost either 10d. a day, for laying, or else by piece work at 13d. the thousand, figures which suggest that a tiler and his mate could lay between 700 and 800 tiles in one day) ; paid to one labourer, working for three days at removing the twigs (*ramellæ*) and tiles from the wall of the granary, taking 6d. per day because it was the Harvest Season . . . ;" — in the 1437 account are : " one acre of stubble for the thatching of the stable, 1s. 4d. ; cutting the stubble, 8d. ; John Abbott, thatcher, and two men for thatching the stable, 2 days work at 1s. 2d. per diem . . . ; Geoffrey Kirkeby and John Bedeman, labourers, . . . mending a gutter near the sea wall of the marsh, by agreement, 7s. ; to the said Geoffrey for making three rods of wall around the manor, by agreement, 10s. ; for gathering 2 waggon loads of ' thakkying roddes ' for the repair of the diary shed, 2d. ; to John Abbott for covering a hole of the said dairy, 6d. ; to John Dedman for making 8 rods of ditch in the marsh, by agreement, 1s. 4d."
(42) F. R. Chapman, *Sacrist Rolls of Ely*, 1907, Vol. 1, p. 44ff.
(43) *Cal. Pat. Rolls*, 1 June 1336, and P.R.O. E.101/468/3, etc.

Castle, and elsewhere. It so happens that one of the works carried out at the Tower in 1337 was a house for Master William de Hurle " next the chamber of the lance-maker " ; the same account mentions another of Hurle's duties as a King's Master Carpenter : an item runs—" recrenellation and cresting of the wall which runs between the gate of the Watergate and the common latrine next the postern opposite the gate of the mint, which wall contains in length by measure measured in the presence of Master William de Rameseye, mason, and Master William de Hurle, master carpenter, 2 royal perches, each of which contains 16½ feet."(44)

The stalls for St. Stephen's Chapel must have been a masterpiece of craftsmanship, for three of our greatest carpenters were all at work upon them : William Hurle, William Herland, and the latter's son Hugh Herland. Their loss is deplorable, and perhaps even more so, that of the original timber vault or roof of the same date.(44a)

A notable feature of mediæval carpentry (as opposed to mason's work) was the manner in which a structure of one period could be re-used in another ; an outstanding example is the removal of Prince Llewelyn's hall from Conway to Caernarvon Castle in 1316 ; it was rebuilt as a whole, at a total cost of £14 3s. 4d., John de Mere, carpenter, being responsible for the work.(45)

There are mentions in some of the accounts of work at the Tower of London of similar re-use of the framing of old timber houses to build new ones. By this means it is quite possible that timber roofs of early type may have been preserved upon later walls ; a comparatively modern example of this is at Worcester, where the 14th-century roof of the Guesten Hall was re-erected above the nave of Holy Trinity Church, built in the 19th century ; an ancient hall at Great Marlow, Bucks, was re-used in the building of Lane End Church ; cases of this having occurred during the Middle Ages are naturally more difficult to find, but it has been suggested that the hall roof at Compton Wynyates was originally at Fullbrooke Castle, and the contract for re-roofing the Bishop's Hall at Durham Castle in 1350 stipulated that the ol dtimber should be re-used, though this probably does not imply that the old design was preserved. Some further instances of house-removal in early times are given in C. F. Innocent's admirable book.(46)

The whole 14th century was an age of great carpentry : in 1316 Robert de Galmeston had made the marvellous Bishop's Throne in Exeter Cathedral ; (47) about the middle of the century the nave of York Minster was vaulted in timber by Philip de Lincoln, who was the cathedral's master carpenter from 1346 until 1375 or later ; from 1346 to 1350 he was paid 20d. a week, after which he received a life grant of 2s. a week ; by 1371 this had been raised to 3s., and in 1374-5 he was granted some houses beside the Minster, by the Chapter.(48)

Thornton Abbey, too, in 1391, was vaulted in wood by a carpenter, William of Ripon(49) probably the same as the William " Wright " of Ripon who in 1399 undertook to make a new roodloft in the great church of Ripon for £3 6s. 8d.(50) An example of work for a private client, the great hall roof at Penshurst was built about the middle of the century.(51)

All this is in addition to the work at Ely, St. Stephen's, Westminster Hall and the College at Winchester, already mentioned. Of the seven structural works named, William de Hurle was concerned with two, the Ely lantern and the roof of St. Stephen's, while Hugh Herland, who had worked as a young man at St. Stephen's under Hurle and his own father, designed the roofs at Winchester and Westminster Hall.

Two other important works of the same period remain for consideration : the great hall roof of Kenilworth Castle, and the Guard Room roof at Lambeth Palace. The latter, which has the moderate span of 28 ft., is said to have been built for Archbishop Courtenay, between 1381 and 1397. It is therefore contemporary with, or a little earlier than, Westminster Hall, and there are certain points of resemblance which seem very significant. At Lambeth each truss consists of a pointed arch springing from corbels some distance below the wall-top, a collar, and two curved struts of greater radius than the arch itself, which also rise from the corbel level, and support the outer ends of the collars. In effect, these outer curved struts, and the principal rafters, form a pair of crucks, but raised to the corbel level ; the complete stability of crucks embedded in the ground is lost, but the thrust is shared by a considerable

(44) P.R.O., E.101/470/1.

(44a) The vault and roof were built in 1345, but most of the timber had been prepared at least as early as 1328, as is shown by an inventory on the back of an account in the P.R.O., E.101/467/7 (1). It seems probable that Master John de Hurlande was the original designer, though William Hurle was in charge of the work of erection. John de Hurlande may well have been William Herland's father ; (the spellings are interchangeable) if so, another masterpiece will have to be added to the known work of this talented family.

(45) P.R.O., S.C.6/1211/7, Quoted by C. R. Peers, *Caernarvon Castle* (Cymmrodorion Society's Publications), 1917.

(46) C. F. Innocent, *Development of English Building Construction*, pp. 85-87 ; I am indebted to my friend, Mr. B. J. Ashwell, for drawing my attention to the case of Compton Wynyates. I find that Leland (*Itinerary*, vol. 4, f. 66) states that Fulbrook Castle was pulled down at the beginning of the reign of Henry VIII, and the materials used at Compton Wynyates, " as some saye."

(47) W. R. Lethaby, *How Exeter Cathedral was Built*, in *Architectural Review*, 1903.

(48) *Fabric Rolls of York Minster*, 1859, *passim*.

(49) Bodleian, *Tanner Papers*, quoted in *Country Life*, 27 July 1935.

(50) *Memorials of Ripon* (Surtees Soc.), Vol. iii.

(51) Historic MSS. Commission, *Report on MSS. of Lord de Lisle and Dudley*, Vol I, 1925, p. xxii.

height of wall, instead of being applied at the top, as, for example, at Penshurst. But though the hammer-beam does not occur in this Lambeth roof, there is a most striking parallel between it and Westminster Hall, for the inner arch and outer curved strut follow almost the same lines as the lower curved strut and lower portion of the great arched rib at Westminster, while the half-span of 14 feet is equal to the distance from the wall surface to the point where the lower curved strut intersects the lower surface of the hammer-beam; moreover, the pierced cusping between the two curved ribs is of very similar type in both examples. There seems every reason to suppose that Hugh Herland was either directly or indirectly responsible for the design of the Lambeth roof; the problem whether it was built before or after Westminster Hall roof can, however, hardly be settled unless further documentary evidence comes to light. The Lambeth roof is, however, very similar to the original roof of Windsor Castle Hall, built in 1362-5, under the supervision of William of Wintringham; the design was probably by William Herland, King's Chief Carpenter at the time.

At Kenilworth, a large amount of building work was done for John of Gaunt, between 1377 and his death in 1399. The new works began apparently about 1380, as John Herleye was then appointed to be surveyor, while in the early part of 1382 he was succeeded by William Hales.(52) It seems that only one detailed account has survived,(53) which merely shows that very little work was being done in the year 1388-9, though it would seem that work was proceeding on "le Oriole" next to the lord's chamber, presumably not the oriel of the great hall, but that of the Presence Chamber on the south side of the court. It is thus impossible to say whether the great hall had already been built, or whether it was part of the later works for which labour was purveyed by Royal patent in 1391.(54) This latter seems decidedly more probable.

The roof of the hall, though now destroyed, is of special importance for the history of roof design, as (supposing it to have been begun rather earlier than that of Westminster Hall in 1394) it seems to have been the first occasion on which an attempt was made to bridge a span of over 40 ft. without intermediate supports and without recourse to vaulting, as at the Ely lantern and the nave of York. The vertical slots still to be seen in the walls rather suggest some form of hammer-beam construction, though it is possible that a very large single arch and collar were used, but it seems improbable that the high walls and very slender buttresses could have been intended to resist so great a thrust, unrelieved by the balancing effect of a hammer-beam. In view of these special points of interest attaching to the Kenilworth roof, it is to be hoped that further research may throw light on the details of its construction. There is at any rate a strong presumption that Hugh Herland may have at least advised on its design, as he was the principal expert carpenter living at the time, and was one of the officials at the Court of John of Gaunt's nephew. In 1399, John Clement was granted the office of master carpenter at the Castle, but there is nothing to show that he had been connected with the building of the hall; though he is said to have rendered the new King Henry IV "good and agreeable service in times past."(54a)

Leaving aside the doubtful attribution of Kenilworth, it is a remarkable fact that a large proportion of the major carpentry works of the century were by the associated masters of the "Westminster School," William de Hurle, and the Herlands.

In considering these great designer-craftsmen, it may not be out of place to mention the old problem: to what extent did the mediæval architect make and use drawings? The subject has been very fully treated by F. B. Andrews in the *Mediæval Builder*, but to the examples there given we may add a few more which do strongly suggest that the chief craftsmen did a good deal of drawing, though there is little evidence as to whether such draughts were "full-sizes" of mouldings, voussoirs, roof-members, etc., or whether they also included smaller scale drawings.(55)

There is evidence that during the fourteenth century there were "tracing houses" at places as far apart as Windsor Castle and Exeter Cathedral, while "tracing boards" and "forms and moulds" are mentioned at Ely, Westminster, and York.(56) Two instances are

(52) Abstract of John of Gaunt's Register, temp. Ric. II, in Literary Search Room, P.R.O. Press 27; 88, 89.

(53) P.R.O., D.L.29/463/7539. There is also some information in the Auditors' Accounts, D.L.29/728/11977, 11979, 11985.

(54) *Cal. Pat. Rolls*, 8 July 1391 (Vol. 1388-92, p. 449).

(54a) Register in P.R.O., D.L.42/15, fo. 5b. Another name which must be considered is that of William of Wintringham, previously mentioned as supervising the building of Windsor Castle Hall roof in 1362-65. He was appointed for life to the office of carpenter to the Duke of Lancaster in March, 1373, for his good service, at fees of £20 a year and a vesture, being called "William Wyntryngham carpenter de Southewerk." In 1374 he is spoken of by John of Gaunt as "master and surveyor of all our works in England" (*John of Gaunt's Register, 1372-76*; 590, 854, 1353-1543). In 1379-80 he built for the Duke new houses, a Chapel, etc., in the Castle of Hertford, by contract for £440. (Register in P.R.O., D.L.42/14, f.81.) He was still alive in 1390, and obtained a shop in Westminster (*Cal. Close Rolls, 1389-92*, p. 173), but died before 10 Feb., 1392. (*Cal. Close Rolls, 1389-92*, pp. 541, 552.) He seems to have owned land in the parish of St. Olave's, Southwark, and to have built houses there. Though he died just before the period of great building activity at Kenilworth, it is possible that he designed the roof for the hall before his death. On the other hand, his death at a critical moment might have led the Duke to call in the assistance of Hugh Herland.

(55) D. Knoop and G. P. Jones, *The Decline of the Mason-Architect*, in *Jnl. R.I.B.A.*, Vol. 44, No. 19 (1937).

(56) F. B. Andrews, F.S.A., *The Mediæval Builder and His Methods*, 1925; D. Knoop and G. P. Jones, *An Introduction to Freemasonry*, 1937, p. 27.

of special importance, in that they show that it was the master craftsman and not some cleric or lay dilettante who made "draughts" and moulds.

At Westminster Palace in 1332, Master Thomas of Canterbury, mason, was paid for "making tracings upon the moulds" and for "drawing upon a tracing," for the work of St. Stephen's Chapel.(57) In 1396, Hugh Herland, "keeper of the King's carpentry works," was regranted "a little house lying in the outer little ward of the Palace of Westminster, near the house of the clerk of the works, for keeping within it his tools (instrumenta) and for making models (formulas) and moulds for his carpentry works";(58) the house had first been granted to him 30 years before, so that he had been a noted designer over a very long period.

In the middle of the next century, if not before, there was a regular "drawing office" at the Palace, as "tracerys" are mentioned as part of the usual appurtenances of the office of the works in the patents of appointment of successive clerks of the works, in 1451 and 1456.(59) Professor Hamilton Thompson quotes from the Exeter Cathedral Fabric Rolls(60) a case where parchment was purchased, on which the mason might show "the form of the work," and suggests that it may only have been a drawing of mouldings; but it seems probable that even a whole skin of parchment would be too small, as well as too expensive, for such work, and that this indicates the preparation of a scale drawing or sketch, such as those in the famous album of Villars de Honnecourt.(60a)

I am only acquainted with two references to moulds earlier than 1300, and both are in the accounts of works at the Tower of London. In 1274 Solomon the Joiner provided two panels, or boards, (tabulis) of fir for the King's works, with trestles and other fittings, and with patterns (formis) for Master Robert of Beverley for timber.(61) Among the purchases in a roll of 1281-4(62) are "divers panels for moulds for the mason's work" bought for 13s. from Stephen Joignour. The weight of evidence suggests that these moulds on panels were drawings of details to full-size, for masonry or carpentry work; they can hardly have been models, as planed boards obtained at a high price from a joiner would not in that case be necessary. Moreover, such full-size details drawn on planed boards of a large size are still in use by masons in Normandy; in 1930 the present writer saw the porch of St. Stephen's, Caen, under repair by a gang of local masons. Many of the decayed voussoirs were being replaced with new ones, which the masons were cutting on the site from a full-size drawing on a board eight or ten feet square; the joints were marked with thick blue lines, and it was obvious that the geometrical setting-out had been done on the board itself. There seems no reason to doubt that these methods are a traditional survival, and that they represent the normal way of building in the Middle Ages.

The civil disturbances of the fifteenth century were unfavourable to the production of great Royal works, but Eton College was being built from 1442 to 1460; the timber work was designed by Robert Whetely, warden of the carpenters, though it is probable that John Goldyng (1438-1451) and Simon Clenchwarton (1451-1461), the King's Chief Carpenters, exercised a general supervision over the work.(63) The roofs of the chapel, of quite considerable span, 39 ft., and of the hall, are beautiful examples of the period.

Later in the century, about 1479-82, the great hall of Eltham Palace was built; (64) the roof is by Edmund Graveley, who was King's Chief Carpenter throughout the reigns of Edward IV and V, and Richard III.(65) Considerable building activity was also evident at the Universities of Oxford and Cambridge: in 1449 the great hall roof of Queens' College, Cambridge, was being built by Thomas Sturgeon, carpenter, of Elsenham, Essex;(66) in 1514 to 1516 Humfry Coke was building the roof of Corpus Christi College Hall at Oxford, while William Vertue and William Est were the masons responsible for the general design. Vertue was the King's Chief Mason at the time,(67) and Coke, already Chief Carpenter at Berwick, since 1509, was soon to be Chief Carpenter, an office which he held from 1519 until his death in 1531; he also designed for Wolsey the great hall roof of Cardinal (now Christ Church)

(57) E. W. Brayley and J. Britton, *History of the Ancient Palace of Westminster*, p. 150, partly quoted in F. B. Andrews, *op. cit.*, p. 81.

(58) *Cal. Pat. Rolls*, 28 Apr. 1396.

(59) *Cal. Pat. Rolls*, 5 Dec. 1451, and 19 May 1456.

(60) A. H. Thompson, *Cathedral Churches of England*, 1925, p. 141.

(60a) A remarkable record of mediæval drawing by a clerical architect, which seems to have attracted little notice, relates to the enormous timber roof of the Palazzo della Ragione at Padua. This roof (240 feet long by 84 wide, untrussed, and held together by a multiplicity of iron tie-rods) is said to have been designed in 1306 by Frate Giovanni, an Austin friar. "He had travelled far and wide in Europe and Asia, to the very Indies, and he had brought back plans and drawings of all the buildings which he had seen, amongst others the drawing of the roof of a great palace in India beyond the sea. This design greatly pleased the Paduans, and they requested him to roof their hall in like manner." (Murray's *Northern Italy*, quoted in T. Morris, *British Carpentry*, 1871, pp. 37-8.

(61) P.R.O., E.101/467/6 (6).

(62) P.R.O., E.101/467/9.

(63) D. Knoop and G. P. Jones, *The Building of Eton College*, in *Ars Quatuor Coronatorum*, Vol. XLVI; R. Willis and J. W. Clark, *Architectural History of the University of Cambridge*, Vol. I, p. 399.

(64) R. S. Rait, *Royal Palaces of England*, 1911, p. 50; A. W. Clapham and W. H. Godfrey, *Some Famous Buildings and their Story*; P.R.O., E.101/496/21.

(65) *Cal. Pat. Rolls*, 14 Oct. 1461, and 20 June 1484.

(66) R. Willis and J. W. Clark, *op. cit.*, Vol. II, p. 9.

(67) For an account of Vertue's career, see W. R. Lethaby, *Westminster Abbey and the King's Craftsmen*, 1906.

College, finished in 1529.(68) One of the last great timber roofs is that of Trinity College, Cambridge, erected in 1604-5 by John Symmes, carpenter, under the general direction of Ralph Symons, freemason.(69)

The first half of the sixteenth century saw considerable work on Royal residences; in 1501 Richmond Palace was rebuilt after a fire, the work including a great hall, 100 ft. long and 40 wide:(70) little is known of the roof beyond its great span, but it was probably designed by Thomas Mauncy, Chief Carpenter to Henry VII.(71) Henry VIII, besides the great hall at Hampton Court, had a large amount of work done at other residences, as at Greenwich Palace, his birthplace, and Nonsuch. Among the later works which still maintain the great traditions of mediæval carpentry are the roofs of the halls of Gray's Inn, 1555-60, and of the Middle Temple, built in 1562-72. Unfortunately, no evidence as to the builders of these splendid works has yet come to light.

The old tradition in smaller works continued through the reigns of James I and Charles I; John Abel (1577-1674) is famous for his half-timbered houses in Herefordshire, some of which still exist, though his town hall at Hereford, probably his finest work, has been destroyed. He also designed town halls or market-houses at Leominster, Brecon and Kington, and the timber work of Abbey Dore Church at its restoration in 1634. When Hereford was besieged by the Scots in 1645, he made mills to grind corn for the loyal forces, and for this service was made one of the King's carpenters by Charles I.(72)

New ideas, however, at last swept away the remains of the great craft system of England, though the craftsman designing his own work, and designing it well, lingered on even through the eighteenth century, and there must be scores of timber-framed houses throughout the country designed and built by village carpenters between 1750 and 1800. Other types of work came their way: in 1758, Richard Hunt and his partner Phillips, village carpenters at Tottenham, Middlesex, obtained the contract for making two new galleries in the parish church for £38 10s.(73)

Hunt, who was born about 1711 and died in 1796,(74) was the son of one carpenter and father of another, and took part in the parochial administration, being a member of the vestry from 1737 until after 1770, and holding various positions from time to time, such as Overseer of the Poor, in 1741, and Surveyor of Highways, 1764; at the same time he farmed about 15 or 20 acres of copyhold land.(75)

This practice of agriculture by craftsmen was undoubtedly a survival of very early times on the manor, when there was not sufficient work for the carpenter or smith to earn his whole livelihood by his craft, but was forced to till the land as well.(76) Is it too much to hope that the days of the industrial town are numbered, and that agriculture and the crafts may lead humanity to an era of peace and progress?

* * *

On the next page is a list of most of the mediæval roofs of large size and a number of smaller ones of special interest, it will be noticed that few strictly domestic roofs find a place, and none of the splendid open timber roofs of parish churches. An important reason is that few of these could compare in size with those on the list; besides, the difficulty of ascribing such works to any named master is against their inclusion in a list which attempts to show that at least a good proportion of mediæval examples are not, as is often thought, anonymous. As local records are being constantly put into print, however, it may soon be possible to compile a second list of the same length, of the minor masterpieces which are intrinsically not less valuable for the history of art than the larger works.(32)

I wish to record here the kindness and courtesy of many who have answered essential queries during the compilation of both text and list, and especially the invaluable assistance of my friends, Mr. H. A. James and Mr. B. J. Ashwell, from whose wide stores of knowledge of mediæval architecture I have been privileged to borrow.

(68) Coke, who had worked at Eton College making drawings for the Cloister and West side of the Court (see D. Knoop and G. P. Jones, *The Sixteenth Century Mason*) was appointed head carpenter to the King on 22 Aug. 1519: (*Letters and Papers of Henry VIII*, Vol. 3, Pt. 1, p. 162) he died in 1531 and was succeeded in office by James Nedeham. That Coke was the designer of the magnificent roof at Christ Church, Oxford, is I think as good as proved by the inclusion of his name, after that of "Mr. Redman" (the mason) in a letter of Wolsey's (*Letters and Papers*, Vol. 4, Pt. 2, 1219-20, quoted in W. D. Caröe, *Tom Tower*, 1923, p. 99) as one of the masters of the works to whose exertions the progress of the building works was due. His office at Berwick-on-Tweed is mentioned in *Letters and Papers*, etc., Vol. I, Pt. 1, 438, (1), m.25, and Vol. II. Pt. 1, 973.

(69) Willis and Clark, *op. cit.*, Vol. II, 490, and see D. Knoop and G. P. Jones, *The Sixteenth Century Mason*, p. 7, n5.

(70) J. Dallaway, *Observations on English Architecture*, 1806, p. 129, n.; from a Parliamentary Survey.

(71) E. B. Jupp, *The Worshipful Company of Carpenters*, 1887, p. 165. An ancient description of the roof (from the *Antiquarian Repertory*) states that it was "not beamyd ne brassid, but proper knotts craftily corven, joyned and shett to guyders with mortes and pynned hangyng pendaunt from the side roff in to the grounde and floure." (quoted in B. Fletcher, *Royal Homes near London*, 1930, p. 164.)

(72) *Dictionary of National Biography*, article "Abel, John"; Royal Commission on Historic Monuments, *Herefordshire*, Vol. 3, Introduction. Good drawings of his town halls at Hereford and Leominster are in John Clayton, *Ancient Timber Edifices of England*, 1846.

(73) Vestry Book of Tottenham, Mddx., 24 July 1758; now in the office of the Town Clerk.

(74) Entry in Family Bible in the possession of F. B. Harvey, Esq. Will of Richard Hunt, Somerset House; P. C. C. Harris 255.

(75) Tottenham Vestry Books, *passim*; Court Rolls of the Manor of Tottenham, in the possession of Messrs. Golding, Hargrove and Golding, Southern House, Cannon Street, London, E.C.4.

(76) On farming by artizans, see C. F. Innocent, *op. cit.*, pp. 94-5; D. Knoop & G. P. Jones, *The Mediæval Mason*, etc.

A SELECTED LIST OF MASTERPIECES OF TIMBERWORK

IN CHRONOLOGICAL ORDER

Examples in italics have been destroyed.

Example	Date	Size	Designer
(1) Leicester Cas. Hall	1106-1118	60×25	
(2) Winchester Cas. Hall	c. 1232-1235	110×28	?Jordan the Carpenter
(It is doubtful if any part of the original roof remains)			
(3) Stokesay Cas. Hall	c. 1280	55×31	
(4) Worcester Guesten Hall	c. 1320-1350	65×35	?Nicholas, carpenter
(5) Ely Cath. Lantern	c. 1330-1340	68×65	William de Hurle
(6) *St. Stephen's Chapel*	1328-1348	86×34	William de Hurle and (?) John de Hurland
(7) *York Cath. nave vault*	c. 1350-1360	208×45	Philip de Lincoln
(8) Durham Cas. Hall	1350	132×36	John de Northallerton
(9) *Warwick Cas. Hall*		62×35	
(10) Penshurst Place Hall	c. 1341-1350	64×39	
(10a) *Windsor Castle Hall*	1362-1365	106×30	William Herland and Wm. of Wintringham
(11) York Merchants' Hall	c. 1367-1370		John Craneby
(12) *New Coll. Ox'fd. Hall*	1380-1386	78×33	? Hugh Herland
(13) Winchester Coll. Chapel	1390-1393	96×30	Hugh Herland
(14) Lambeth Pal. Guardr'm	c. 1390	56×28	
(15) *Thornton Abbey vault*	c. 1391	145×27	William de Ripon
(16) *Kenilworth Cas. Hall*	c. 1392	90×45	
(17) Westminster Hall	1394-1400	238×69	Hugh Herland
(18) *London Guildhall*	c. 1411-1430	153×49	
(19) York Guildhall	c. 1446	93×22	
(20) Queens' Coll. Cam.	1449	50×28	Thomas Sturgeon
(21) Eton Coll. Chapel	c. 1445-1460	150×39	Robert Whetely
(22) Crosby Hall, London	1466-1470	69×28	
(23) Eltham Pal. Hall	c. 1479-1482	100×36	Edmund Graveley
(24) *Richmond Pal. Hall*	c. 1501	100×40	?Thomas Mauncy
(25) Corpus Chr. Coll. Ox.	c. 1516	50×25	Humfry Coke
(26) Christ Ch. Coll. Ox'fd	1526-1529	113×40	Humfry Coke
(27) Hampton Court Pal.	1532-1536	108×40	James Nedeham
(27a) *Cowdray Hall*	c. 1540	60×28	
(28) Gray's Inn Hall	1555-1560	70×35	
(29) Middle Temple Hall	1562-1572	100×40	
(30) Trinity Coll. Cam.	1604-1605	100×40	John Symmes
(31) Lambeth Pal. Hall	1661-1663	93×38	?Christopher Wren

NOTES AND AUTHORITIES TO LIST AND REMARKS

(1) G. T. Clark, *Mediæval Military Architecture in England*, 1884, Vol. 2.

(2) Victoria County History, *Hampshire*; *Calendar of Liberate Rolls*, Vol. 1, *passim*.

(3) B. F. Fletcher, *History of Architecture*; A. H. Thompson, *Military Architecture in England*, 1912.

(4) Victoria County History, *Worcestershire*; Worcester Historical Society, *Accounts and Compotus Rolls of the Priory of Worcester* (Vols. 24-26).

(5) F. R. Chapman, *Sacrist Rolls of Ely*.

(6) E. W. Brayley and J. Britton, *History of the Ancient Palace of Westminster*; W. R. Lethaby, *Westminster Abbey and the King's Craftsmen*.

(7) J. Raine, *Fabric Rolls of York Minster*.

(8) Victoria County History, *Durham*, Vol. 3, pp. 22, 74; Deputy Keeper's Report, xxxi, 113.

(9) A. H. Thompson, *Military Architecture in England*.

(10) T. H. Turner and J. H. Parker, *Domestic Architecture in England*; Hist. MSS. Comm. *Report on the MSS. of Lord de Lisle and Dudley*.

(10a) W. H. St. J. Hope, *Windsor Castle*, i, 185 and reproduction of Hollar's engraving of original roof.

(11) Surtees Soc., No. 92, *The York Mercers and Merchant Adventurers*, 1917.

(12) A. Vallance, *The Old Colleges of Oxford*, 1912.

(13) Victoria County History, *Hampshire*; Household Account Roll of 1393, at Winchester College; W. and J. H. Harvey, *Master Hugh Herland*, in *The Connoisseur*, June 1936.

(14) W. H. Godfrey, *Architecture in London*, 1911 (esp. Fig. 94); D. Gardiner, *Story of Lambeth Palace*, 1930.

(15) *Country Life*, 27 July 1935; *Tanner Papers* in Bodleian.

(16) *Kenilworth Illustrated*, 1821; Knowles, *Kenilworth Castle*, 1872; G. T. Clark, *Mediæval Military Architecture*.

(17) F. Baines, *Westminster Hall*, 1914 (H.M.S.O.); W. Harvey in *The Builder*, 5 Jan. 1923.

(18) R. R. Sharpe, *Calendar of Letter-books of the City*; J. E. Price, *Descriptive Account of the Guildhall*, 1886; J. J. Baddeley, *Guide to the Guildhall*, 1898. An engraving of the original roof is in James Smith, *A Specimen of Ancient Carpentry*, 1736.

(19) T. P. Cooper, *Guide to the Guildhall of the City of York*. A copy of this guide was very kindly sent me by R. Anderson, Esq., Town Clerk.

(20) R. Willis and J. W. Clark, *Architectural History of the University of Cambridge*.

(21) Willis and Clark, *op. cit.*; D. Knoop and G. P. Jones, *The Building of Eton College*.

(22) A. W. Clapham and W. H. Godfrey, *Some Famous Buildings and their Story*.

(23) Clapham and Godfrey, *op. cit.*

(24) Victoria County History, *Surrey*.

(25) T. Fowler, *Corpus Christi College*, Oxford, 1898.

(26) A. Vallance, *op. cit.*; W. D. Caröe, *Tom Tower*, 1923.

(27) E. Law, *History of Hampton Court Palace*. Bodleian *Rawlinson* MS. D.775.

(27a) T. Garner and A. Stratton, *Domestic Architecture of England during the Tudor Period*, 1894, Vol. I.

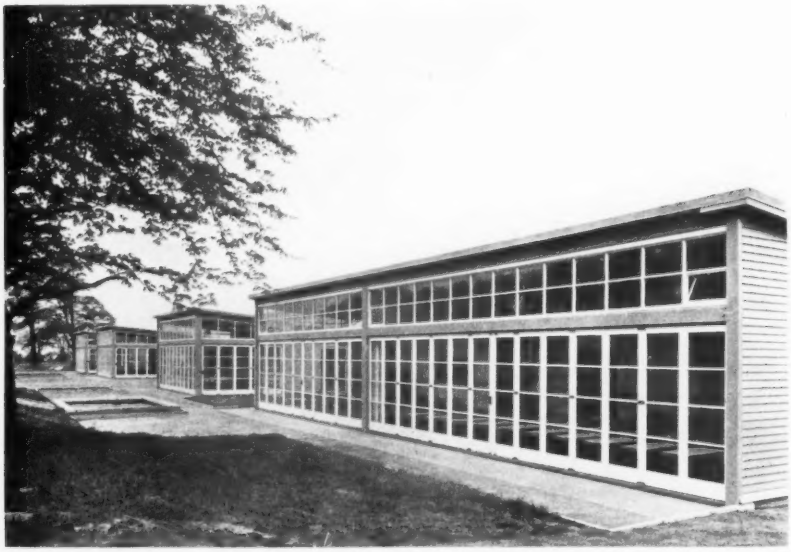
(28) Royal Commission on Historical Monuments, *London*, II.

(29) Roy. Comm. Hist. Mon., *London*, IV; J. B. Williamson, *Middle Temple Hall*.

(30) Willis and Clark, *op. cit.*

(31) D. Gardiner, *Story of Lambeth Palace*.

(32) Apart from the individual references given in the notes to text and list, the following are essential to the study of the subject: F. E. Howard and F. H. Crossley, *English Church Woodwork*, 1917; F. E. Howard, *On the Construction of Mediæval Roofs*, *Archæological Jnl.*, Vol. LXXI, 1914; H. Cescinsky and E. R. Gribble, *Early English Furniture and Woodwork*, Vol. I; T. H. Turner and J. H. Parker, *Domestic Architecture in England*, 1859-77; for the history of individual craftsmen in the Middle Ages, see the works mentioned in text notes (1) and (2); also F. B. Andrews, *The Mediæval Builder*, 1925; M. S. Briggs, *The Architect in History*, 1927; A. Hamilton Thompson, *Cathedral Builders*, in *History*, July 1925, and *Mediæval Building Documents*, in *Trans. Somerset Arch. Soc.*, Vol. XLVI, 1920; R. E. Swartwout, *The Monastic Craftsman*, 1932; and see bibliography of the question of master builders in Francis Bond, *Gothic Architecture in England*, 1906.



OPEN AIR SCHOOL

SWINTON AND PENDLEBURY LANCASHIRE

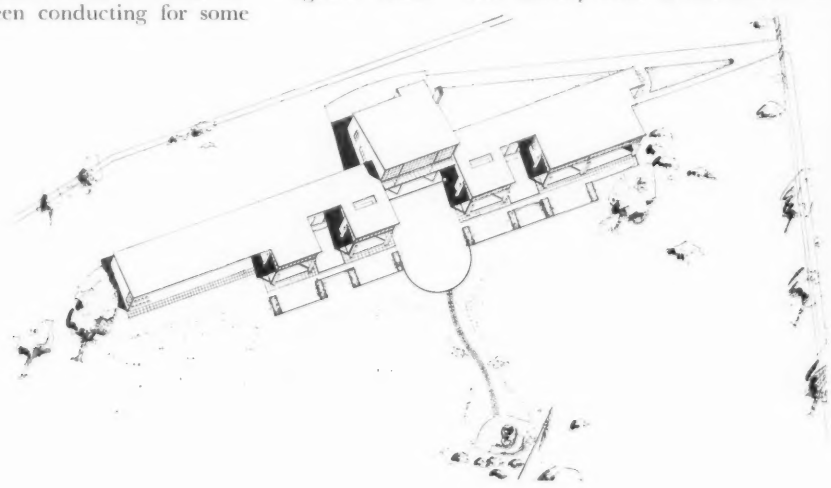
Architect:
Hubert Bennett [*A.*]

This open-air school has a very novel and economical construction, a skilful plan, and presents several detail points of great interest. It is planned to accommodate 135 children, of which 30 are nursery, 35 infants, 35 juniors and 35 seniors. All the children are selected on account of some physical defect which makes them unfitted for ordinary school life, such as malnutrition, asthma, bronchitis, poor eyesight, stammering or tuberculous glands. The aim is to give them a combined way of life and special treatment, which includes fresh air and sunlight, proper diet, rest, medical attention and special educational methods. The new school is the sequel to experiments in this treatment which the Education Authority have been conducting for some years.

SITE AND PLAN

The site is seven acres of undulating parkland containing a large number of trees. Part of it has been levelled to avoid steps in the school, and also to retain views. The plan is very simple, depending on one long main corridor for circulation, on the south-east side of which are all the classrooms and rest rooms, the lavatories and secondary rooms being on the opposite side.

Three sides of every classroom consist entirely of window, fitted with folding-sliding units so that classes will be held in open-air conditions, but with protection against winds. The nursery suite is the first in the

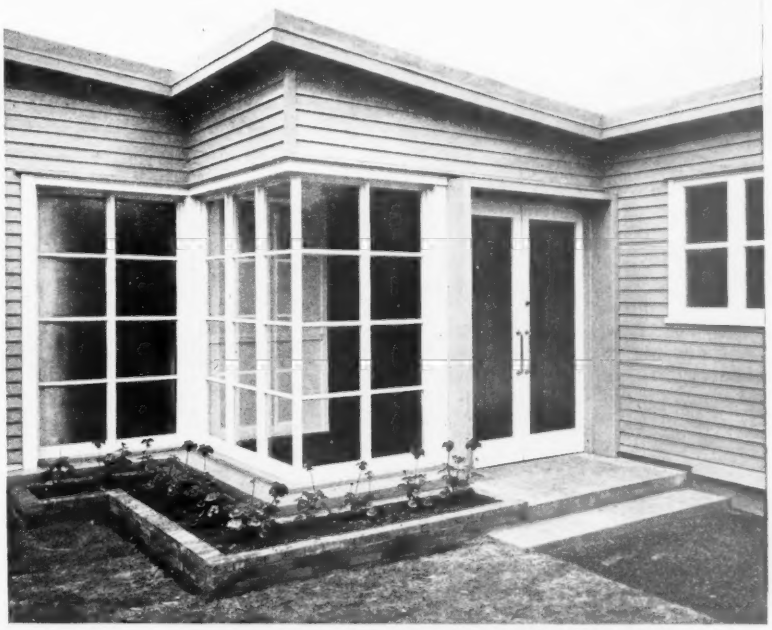


General view axonometric: drawing by the architect

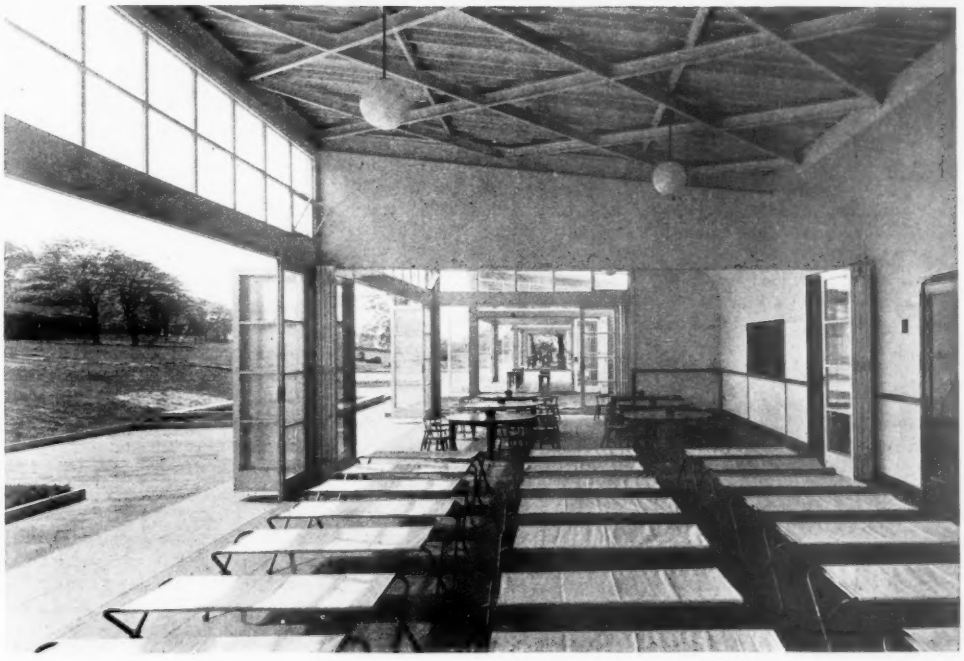
country to be provided in an open-air school. It is self-contained with its own entrance, lavatories, equipment store and blanket store, etc. The main room of the department is divided into two by a folding partition which allows children who require more rest than others to remain on their beds while the others play.

STRUCTURE

This consists essentially of a single-span roof supported on stanchions, and the walls infilled with timber framing. The roof is on the "Diagrid" principle, built up entirely of 4-in. by 2-in. R.S.J.s, arranged in a diagonal mesh. This system allows wide spans to be covered with a roof

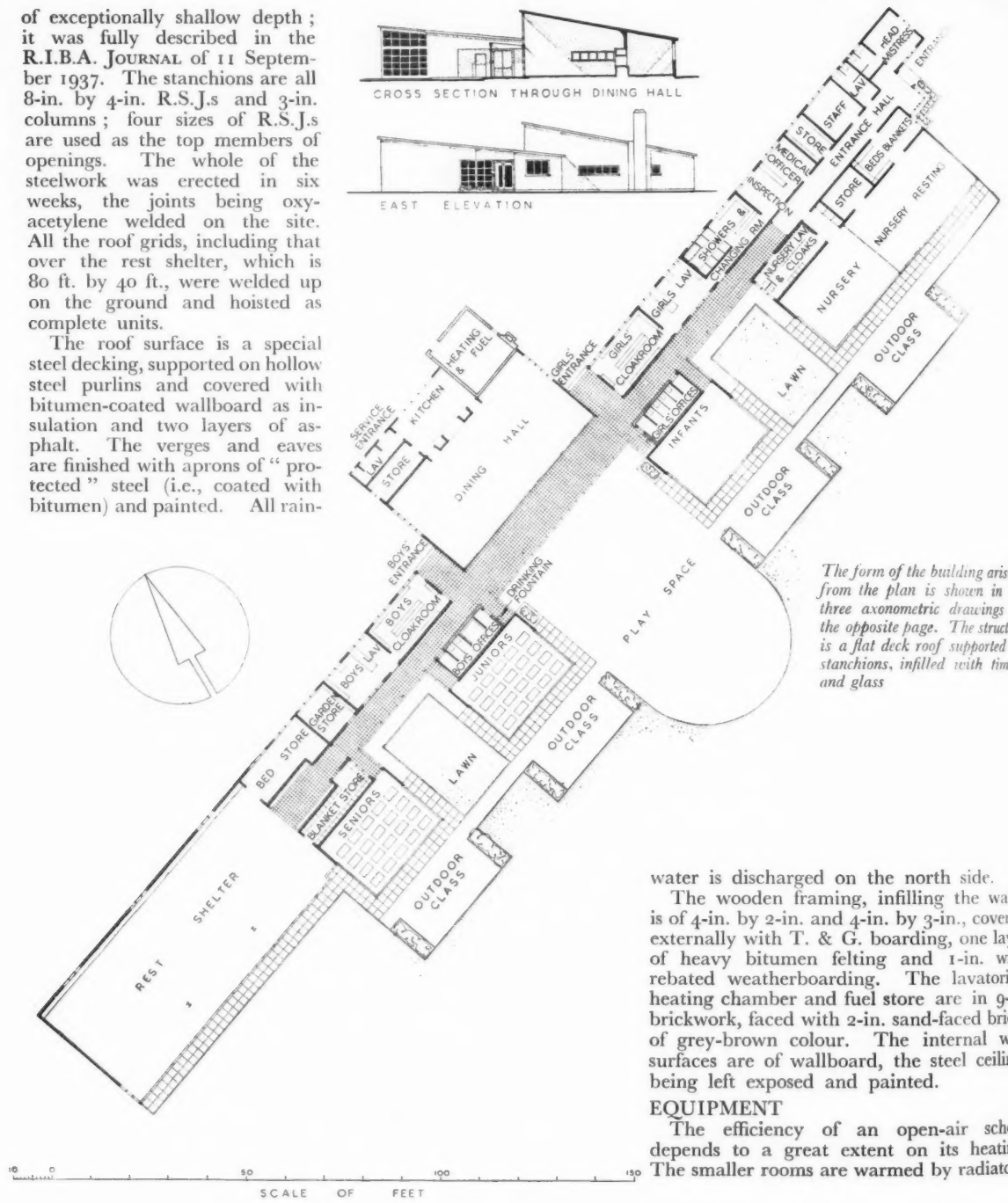


Above, the main entrance is a typical detail of the exterior finish. The weather-boarding is painted a mid-Wedgwood blue and the windows ivory. Below, from the interior of the Nursery School looking through the classrooms with all the folding screens open



of exceptionally shallow depth; it was fully described in the R.I.B.A. JOURNAL of 11 September 1937. The stanchions are all 8-in. by 4-in. R.S.J.s and 3-in. columns; four sizes of R.S.J.s are used as the top members of openings. The whole of the steelwork was erected in six weeks, the joints being oxy-acetylene welded on the site. All the roof grids, including that over the rest shelter, which is 80 ft. by 40 ft., were welded up on the ground and hoisted as complete units.

The roof surface is a special steel decking, supported on hollow steel purlins and covered with bitumen-coated wallboard as insulation and two layers of asphalt. The verges and eaves are finished with aprons of "protected" steel (i.e., coated with bitumen) and painted. All rain-



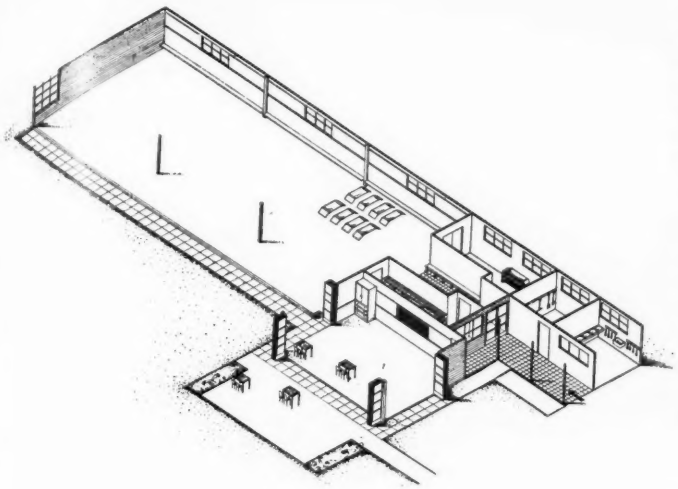
The form of the building arising from the plan is shown in the three axonometric drawings on the opposite page. The structure is a flat deck roof supported on stanchions, infilled with timber and glass

water is discharged on the north side.

The wooden framing, infilling the walls, is of 4-in. by 2-in. and 4-in. by 3-in., covered externally with T. & G. boarding, one layer of heavy bitumen felting and 1-in. wrot rebated weatherboarding. The lavatories, heating chamber and fuel store are in 9-in. brickwork, faced with 2-in. sand-faced bricks of grey-brown colour. The internal wall surfaces are of wallboard, the steel ceilings being left exposed and painted.

EQUIPMENT

The efficiency of an open-air school depends to a great extent on its heating. The smaller rooms are warmed by radiators,

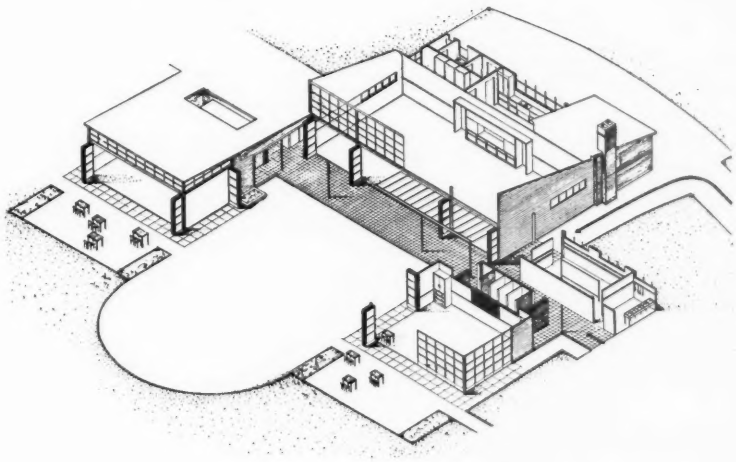


ivory. The 3-in. steel columns are painted post office red. All dadoes inside the school have a glazed white finish, the walls and ceilings ivory white flat paint. Slightly different tone values of greys, blues and greens have been given to the woodwork of different rooms. The dining-room has two wall paintings by Louise Aldred.

A globe, 10 ft. in diameter, has been placed on the axis of the dining hall. It is framed in steel and covered with cement rendering on expanded metal. A curved ramp with flower boxes half encircles it.

COST

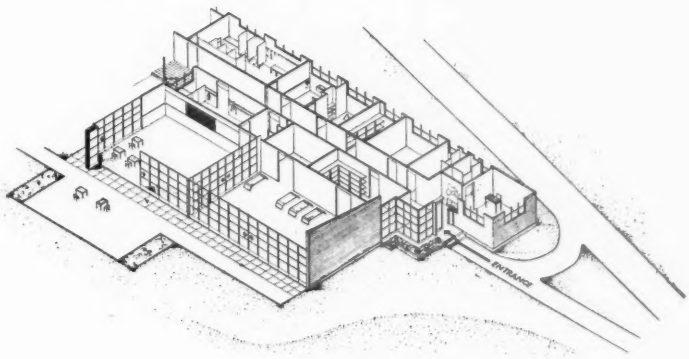
The total cost of the building was £9,500. The site work, play spaces, roads, gardening and fencing cost an additional £1,600.

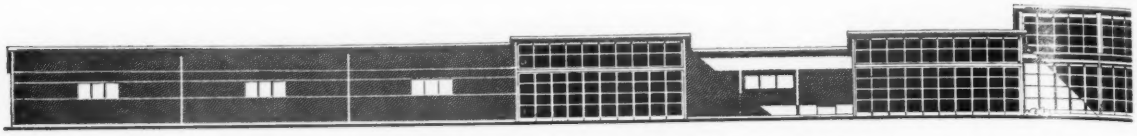


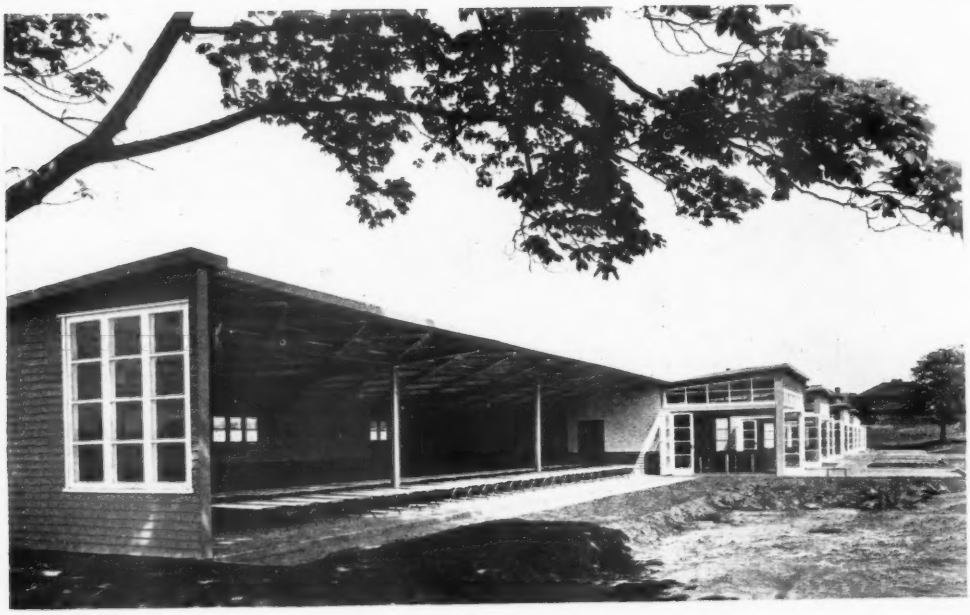
but the classrooms and hall have a patent under-floor heating system consisting of special units through which hot water circulates, causing the whole floor to act as a low-temperature warming panel. The upper surface consists of "Granwood" blocks. Gas-firing is used for the kitchen equipment, which includes a range, milk boiler, hot plate and two 20-gallon vegetable boilers.

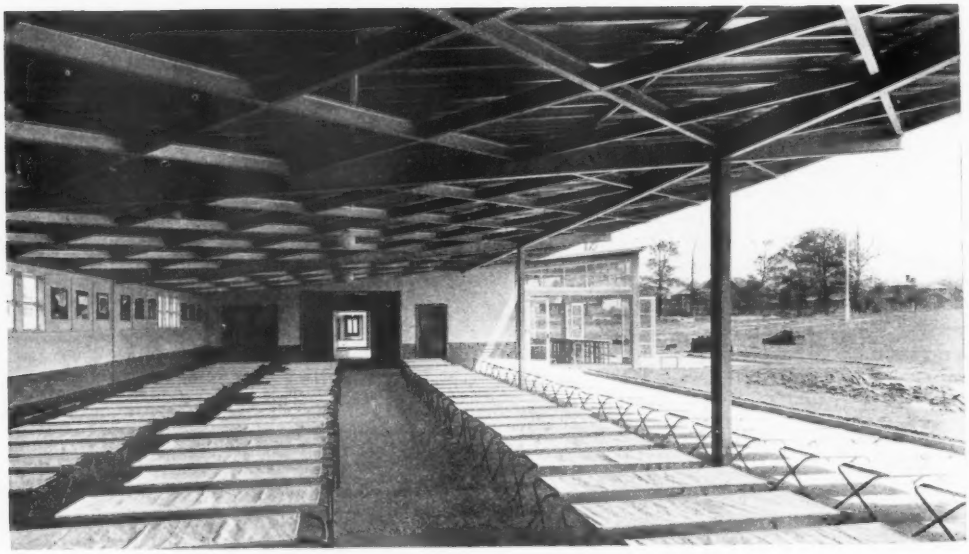
DECORATION

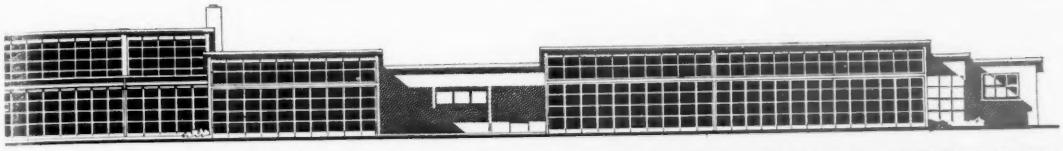
The external wall surface of the weather-boarding is painted a mid-Wedgwood blue, the window frames and surrounds being

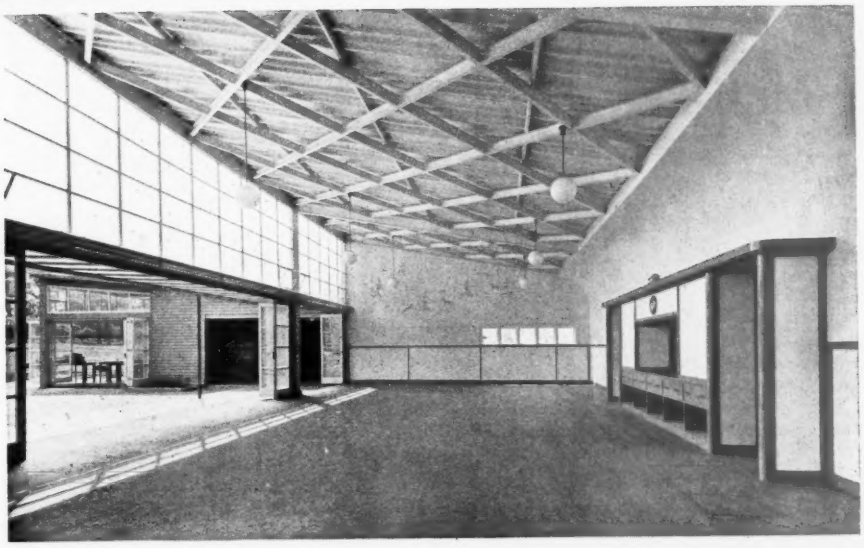


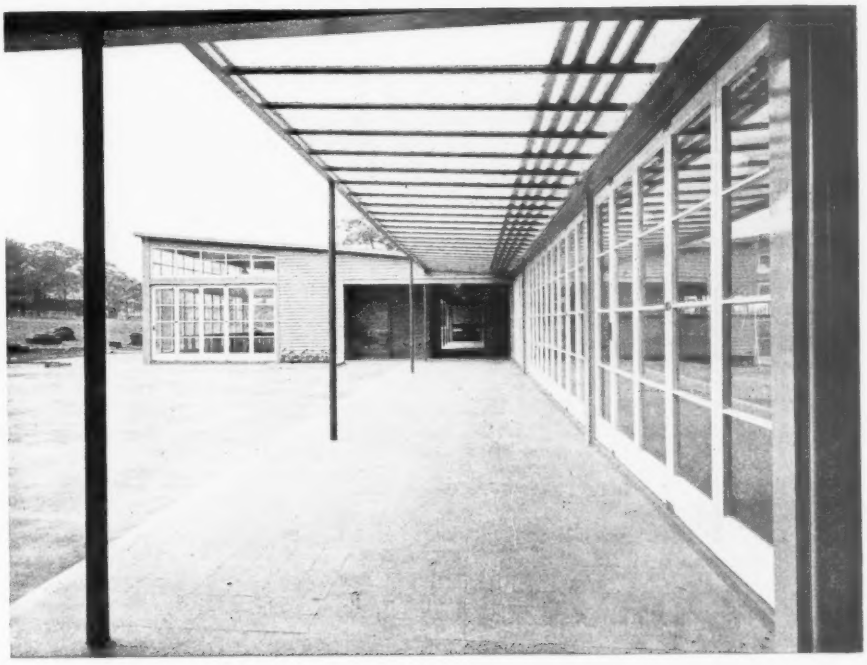




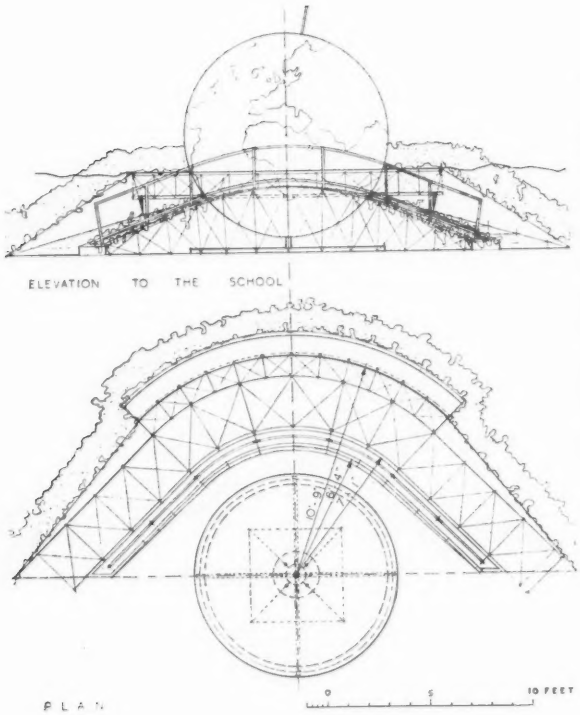








The view of the **Dining Hall** *(above) shows clearly the steel "Diagrid" roof construction, hollow steel purlins and steel roof decking; this is used throughout the building. The top surface is insulated with bitumen-coated wallboard and finished with asphalt. Below is the main corridor in front of the dining hall. Battens from which the glass can be cleaned are seen above the roof. The corridor floor is red quarries. On the opposite page are two views of the rest shelter*



CONTRACTORS AND SUPPLIERS OF MATERIALS :

General Contractors : The Atlas Building and Construction Company.

Sub-Contractors and Suppliers :—Asphalt : John Dickinson & Co., Bolton, Ltd. Steelwork : Diagrid Structures, Ltd. Fabrication : Oxley Engineering Company, Ltd. Globe steelwork : Edward Wood & Co., Ltd. Steel decking and roofing : The Ruberoid Company, Ltd. Patent glazing : Helliwell & Co., Ltd. Flooring, heating and hot water supply : The Granwood Flooring Company, Ltd. Electric fittings : The Merchant Adventurers, Ltd., Zeiss Ikon, Ltd., and Oswald Holman. Clocks : Gent & Co., Ltd. Sanitary fittings : B. Finch & Co., Ltd. Wallboarding : The Patent Impermeable Millboard Company, Ltd. Glazed asbestos : Turners Asbestos Cement Company. Bricks : The Accrington Brick Company. Door furniture : The Dryad Metal Works. Metalwork : Bayliss, Jones and Bayliss, Ltd.

The architect's working drawing of the globe and curved ramp which are on the axis of the dining hall. (*See axonometric on page 744.*) *The globe is made of steel framing, expanded metal and cement rendering. Below, the school at night*

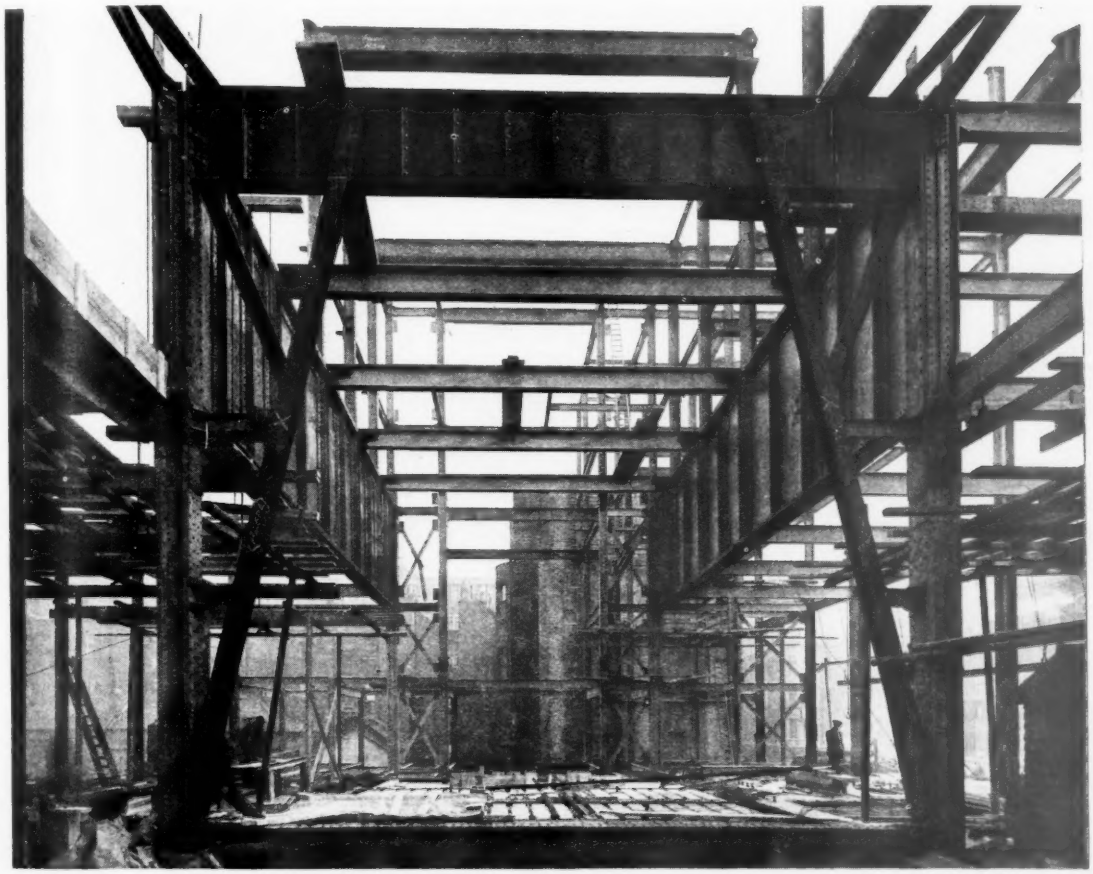


Photo: Mattw. T. Shaw & Co. Ltd.

ENGINEERING PROBLEMS IN MODERN ARCHITECTURAL DESIGN

By R. T. JAMES, M.Inst.C.E., A.C.G.I., M.Cons.E.

A paper read before the Institution of Engineers and Shipbuilders of Scotland on Tuesday, 25 January 1938

Architectural design has always produced a variety of engineering problems, and this paper will deal only with some common problems resulting from modern practice, or rather modern requirements.

It is true that during the lean times since the war an architect's task has been very hard. In many instances now he is first presented with a financial problem, namely, on a site worth £*x*, to plan a building of a quality and with accommodation that, after allowing for ground rent, rates, maintenance, sinking funds, mortgage charges, etc., will bring his clients a certain return and provide them with arguments sufficiently convincing to persuade investors to provide the necessary capital. This of course means that the

capital cost is pared down to a minimum, although the requirements of the building are raised to a maximum. For example, the columns and beams must be of the minimum dimensions, lifts must be fast, heating and ventilating must be perfect, there must be no dark or unlettable floor areas, and while the building must utilise economically every square foot of the site and every bit of daylight reaching it, it must be good æsthetically and be more attractive to possible customers than the adjacent competing building; furthermore, it must be built fast so that every pound of revenue can be obtained at the earliest possible moment. Meanwhile the foundation conditions are not improving, and frequently adjacent properties are old and structurally unsound, with the owners jealously guarding their rights.

These conditions (and they are true in a great number of instances) have brought with them new values and controversies as to the æsthetics and functions of architecture, and modern structural engineering has enabled architects to put into solid form some of the dreams and visions and propositions of the less conservative architects, and enabled them to satisfy the economic problems mentioned above. It might almost be said that the function of the modern structural engineer is to cut the cost of the carcase of the building, speed up the work, build what the architect would like to build, and at the same time satisfy building laws that are sometimes out of date.

In modern times there has been a great deal of research in all branches of engineering and this has had its effect on structural engineering. Further, while this has been going on all over the world, it appears that there has been and is a great deal of publishing of these researches and the modern engineer has a great wealth of published information to study from the Continent, America, and even China, Japan and Russia. This, with the drive of the lean conditions behind it, has enabled him to design what may almost be called revolutionary structures so far as buildings are concerned, and the general research in mechanical and electrical engineering has enabled fabricators to develop equipment and machines to build them. There is generally a little lag on the part of the fabricators, resulting often in a high price per ton or unit for something that is perhaps a little too unusual, but this is not necessarily detrimental on the whole, since it forces the designer to examine to exhaustion methods of obtaining the required structure or design by more orthodox means and using more usual sections and methods of manufacture before departing from them. For example, in structural steelwork, although the improvement in fabricators' equipment has enabled larger and thicker plates to be shaped, machined and welded, the cost per ton of welded structural components is still very high and leads to a closer study of the structural problem using standard sections bolted or riveted together before a solution is attempted using welded components, however attractive it may at first appear. There must be a very good argument indeed to justify the usually necessary applications for consent and the negotiations with the building authorities.

Nevertheless, the increase in theoretical research leading to a greater knowledge of the behaviour of structures and more exact design engenders a safe, steady and sure growth of the acceptance of what were novel and experimental systems of design and construction. The Steel Structures Research Committee recently published a report which, while pointing out fallacies even in the 1932 London Building Code, proposed the nucleus of a new building design code based upon the most modern conception of the behaviour of a building frame, namely, the rigidity of the connection between a beam and a stanchion. This is a big advance, since at least in official circles this rigidity or restraint has hitherto been regarded as a "secondary" effect to be guarded against or to limit primary stresses, as opposed to the idea of its being the basis on which a structure can be designed. Steel beam and stanchion frames and trusses used to be designed on the assumption that all joints were pin-jointed or hinged, that is to say, that a change could take place in the angle between the components of a structure due to resistance to external loading without affecting the form or the system of interaction between the components. Since in practice such joints had some degree of rigidity this was not true. For example, if a beam bolted to a stanchion deflected under load, it would, through the medium of the connection, tend to transmit some of its bending to the stanchion with a consequent reduction of positive bending stresses in the beam and an increase of bending in the stanchion. The amount of such variations not being known or recognised, at least by building codes, such codes or generally accepted methods of design merely treated these effects as "secondary" and safeguarded against them by limiting the maximum permissible stresses under simple methods of design.

Of course, in large structures such as bridge trusses, these secondary effects were carefully analysed, but such trusses were not then usually used in buildings. With the advent of reinforced concrete building frames it was a poor imagination that could call such stresses "secondary" when a beam was necessarily monolithic with its stanchion. For example, where a long-span beam was connected to a short stanchion the secondary stresses at the joint and in the stanchion were very much more primary than the simple compression stresses in the stanchion. Therefore a study is now made of the behaviour of the frame and the effect on it of joints and connections, and the more exact knowledge and deductions obtained from such studies and analyses has justified the use of higher stresses, since it is now

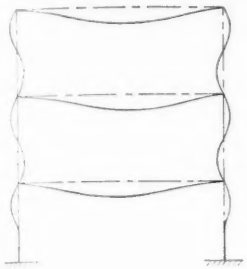


Fig. 1

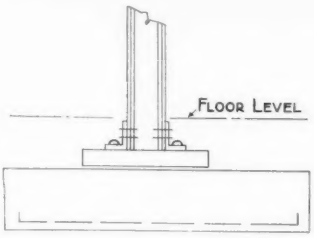


Fig. 2

known more exactly what and where the maximum stresses are. But the matter goes a little deeper than that. The need for economy emphasised the need for the elimination of any material that is not fully used. In other words, the only stresses that are required in a structure are those which produce an appreciable resistance to the externally applied loads. It is better, therefore, to attempt to make use of such secondary or subsidiary stresses to resist the externally applied loads; and that is the trend of modern structural design as distinct from earlier empirical methods which had the margin and required material (which costs money) to cover internal, local, secondary stresses induced by internal deformation, although such stresses were not calculated to resist directly any externally applied load.

The word "trend" is used since the designers still have to make assumptions and provide margins, although the margins are narrower when designing monolithic frames such as reinforced concrete or welded structures.

Allowances still have to be made for such unknown or local stresses as those around rivet holes, building stresses, stresses due to lack of homogeneity in the material, and to uncertainties of perfect elasticity, etc. The ductility of modern mild steel is to some extent a safeguard against these local and hidden stresses, but analyses and studies of the effect of local high intensity stresses are being continuously made. Furthermore, assumptions have to be made in practice to be able to lessen the time for practical designing in the office. There is almost a deluge of current technical researches and theoretical algebraic investigations into structural action depending on fixity of connections, and the practical designer, whilst taking the greatest

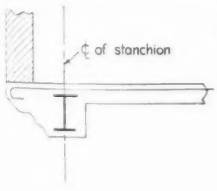


Fig. 4

Fig. 5

Fig. 3

advantage of these, has to be discriminating in the extent to which he applies the results, particularly where components with varying cross sections are used.

Attention was also focused upon the importance of fixity of connections in designing building frames by the system adopted in steel frame skyscrapers to resist lateral wind load. Here the rigidity of the beam and stanchion frame is obtained mainly by designing the connections so that they are sufficiently strong to take the bending due to lateral loading, and designing the stanchions and beams to take the bending transmitted to them through the connections.

Referring back to the architectural problem, it is seen that if an architect designs a high building subject to lateral loading, and his planning necessitates large-span beams and columns in order to obtain the accommodation and clearances required, it is no use asking him to allow some lateral cross bracing or to have a particular column large or battened. He would reply that he wanted windows in place of the cross bracing, that the extra square foot of floor area taken up by the large column was worth 10s. a year, and that he wanted the depth of a girder and the cost of the steelwork reduced in any event. Consequently, the normal modern multi-storey frame of a building, whether in steel or in reinforced concrete, is designed as far as possible to satisfy the principle as indicated in Fig. 1. Wherever possible (and sometimes "possible" means possible under the building laws) advantage is taken of the interaction of all components of the frame and of the material in the building, including connections, to resist the loads applied to the frame.

There are numerous other minor refinements in modern practice in designing for speed and to save space and expense. Examples of these are (*a*) the bloom base, where a solid slab of steel forms the stanchion base, the stanchion shaft and its cleats and the top of the slab being machined so that the load in the stanchion is transmitted to the base without the needs of gussets, etc. This enables the depth below the finished floor level of the base and its foundation to be much less than if a gusseted or cast iron base were used as formerly, Fig. 2. (*b*) Continuous beams and floor slabs are used as much as possible either in steel or, of course, in reinforced concrete, when the depth is reduced considerably and the maximum headroom obtained, Fig. 3. (*c*) Shop-welded

Fig. 6

cleats and crank beams are used to avoid bulk. (*d*) Cantilevering of reinforced concrete floors is adopted to provide wall bearing, etc., Fig. 4. (*e*) Reinforced concrete floors help to brace the top flange of a long girder against lateral buckling, and thus cut down the steel weight.

These and many other small refinements cumulatively have enabled the cost and bulk of building frames to be minimised, and they are mainly the outcome of necessity and of the increase of knowledge and the improvement of fabricators' equipment. For example, a mitre cut and weld for cranking a beam, which now seems normal for staircase stringers, mansards, etc., was a novelty eight or nine years ago.

Before referring to the more specialised and intricate problems, mention may be made of a few general cases applicable to the ordinary framed building apart from bulk, conception of structural planning, etc. The trend is to cut down weight, not only the actual deadweight but the statutory loads to be carried, since the cumulative effect of this is felt throughout the structure and shows itself in the cost of floors, frames and foundations. Firstly, the statutory superimposed loads on the floors have been reduced to figures more nearly approaching the actual values met with in practice, either by newer regulations or by application to authorities for waiver. But with the reduction in margin, however, it is necessary to make careful analyses of the relative effects of loaded and unloaded bays and parts of the frame, particularly with continuous structures. Subsidiary beams may be designed for a smaller unit superimposed load than the floor slab they carry, and similarly, main beams may be designed for less than secondary beams and girders for less than main beams, without in any way reducing the factor of safety of the building below a safe value. A careful investigation is made of the effect of concentrated loads, and actual equipment may be weighed. For example, in a multi-storey block of flats, where the multiplication of types, etc., necessitated a very close analysis of one unit, the actual loads and stresses in a small bathroom floor were calculated when a large man was having a bath. But again in such instances knowledge and care are necessary to prevent excessive deflections, which might cause the plaster to crack and the saving in cost would be offset by trouble to the architect and owners.

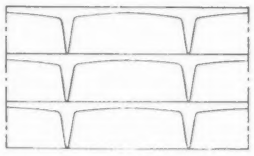
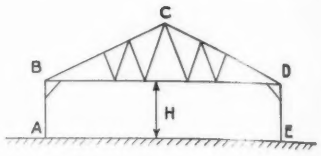


Fig. 7



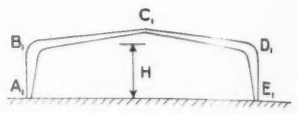


Fig. 8

Fig. 9

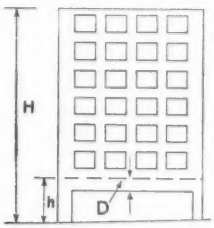


Fig. 10

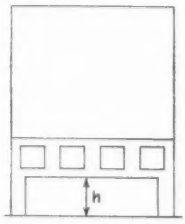


Fig. 11

The principle of the two-hinged arch or portal frame is being increasingly adopted in buildings, since the theoretical form required can be shaped in reinforced concrete, and in steel greater facilities are given by modern fabricating machinery. Referring to Fig. 5, suppose an arch to be resting on rollers ; then if it be loaded it will tend to spread at the springing. If the ends be hinged but fixed in position, a horizontal resisting force would be required which in a building can be provided by a floor. A portal frame as indicated is very suited to a building since the shape can be as in Fig. 6, where there is plenty of room for windows. If necessary, the portals can be superimposed on one

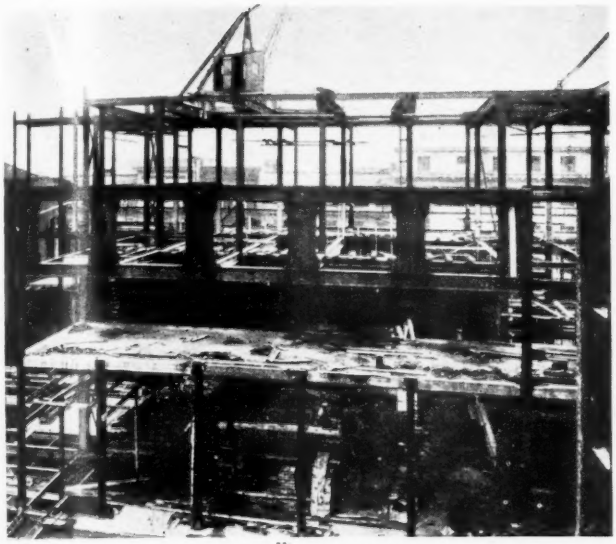


Fig. 12

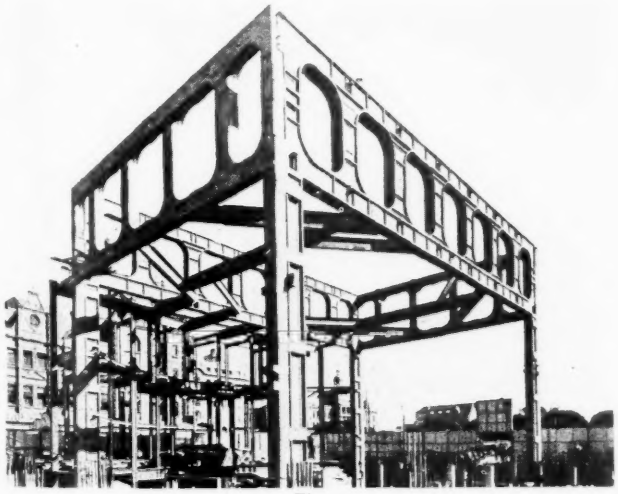


Fig. 13

another, in which case the form of building diagrammatically shown in Fig. 7 is obtained.

The form is often suitable for architectural requirements since it gives good headroom in spite of heavy loading; the shape of the columns is generally such as to give the best accommodation for the load, and by their nature the frames are stiff and rigid and have small deflections and great resistance to lateral loading. It can be imagined how this suits an architect in that it offers a solution of his usual problems, namely, height restriction laws combined with the necessity of obtaining accommodation, while having the minimum floor heights and yet allowing plenty of light into the interior of the building. This again is a case for economy and careful study into the effects of unequal loading on a continuous structure. Rule-of-thumb methods would not only be extravagant but possibly unsafe.

The portal arch, whether of steel or reinforced concrete, is also suitable for simple roofed structures, such as garages, top floors of buildings, buildings for storage, railway stations, etc., and generally in structures where the main requirement is floor space and headroom. In Fig. 8 with the normal roof truss the headroom is measured to the lowest chord, but the rise between the lowest chord and the ridge of the roof is considerable. The area to be covered by roofing material and/or walls and glazing is, for the unit length, the perimeter A B C D E. Now if a portal frame is used the height above the lowest flange of the portal is small; in practice, it is only about 2 ft. for a span of about 100 ft. Consequently, the area $A_1B_1C_1D_1E_1$ is very much less than it would be with a lattice roof, and this saving in capital cost can be very considerable. There is less cost of maintenance, since it is the roof covering that involves an annual expenditure for cleaning, glazing, breakages, etc. Further, the lattice principle being composed of a number of components of small section, it takes more paint and maintenance itself than the single large member of the portal; it is less resistant as a whole to corrosion and has less reserve of strength; it has greater areas for collecting dust, and obstructs light from the roof glazing.

Fig. 9 shows a practical design. Apart from greater accuracy in design, there is nothing particularly novel in these portal frames, or two-hinged arches. Their use is

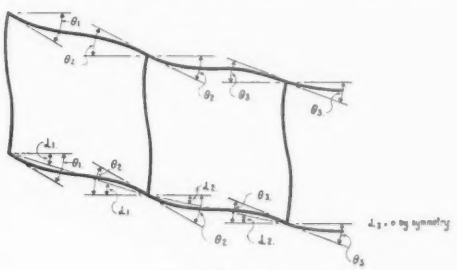


Fig. 14

increasing because of the development of machinery for welding and the shaping and machining of plates. This enables them to be constructed with considerably less dead-weight than if they had been built up like plate girders and then spliced by riveting. The shaping and the welding enables the depth of the I-section to follow that required by the calculated bending moment, which gives a pleasing shape and the greatest headroom in the centre where it is generally required and, in most instances, that external slope required for glazing and for the usual roof coverings. Their restriction is in the ratio of the height of the vertical leg to the span and, so far as roofs are concerned, their theoretically ideal shape is of course parabolic.

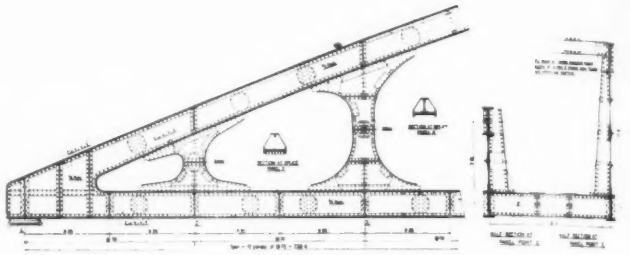


Fig. 15

In more "clothed" buildings an architect can do little with lattice roof trusses but hide them, but in buildings such as school assembly halls and similar parts of elaborate buildings, some architects have made portals form the basis of their architectural treatment. It has been stated that in planning a building an architect is often faced with a restriction in the height which, if he has to obtain a certain floor area, restricts the floor height, while at the same time he requires a large-span load-carrying girder to give a clear space between some columns. Such a case is shown diagrammatically in Fig. 10, where the architect is restricted to distance H, and requires a clear height *h*, and cannot afford the depth of girder D. In that event the open-webbed girder, or Vierendeel truss, becomes very useful, as in Fig. 11, where a truss is made depth D, that is, a full floor height, one chord of the truss being at one floor level, and the other at another floor level, the truss having no cross bracing to prevent the construction of windows. Such a truss is shown in Figs. 12 and 13.

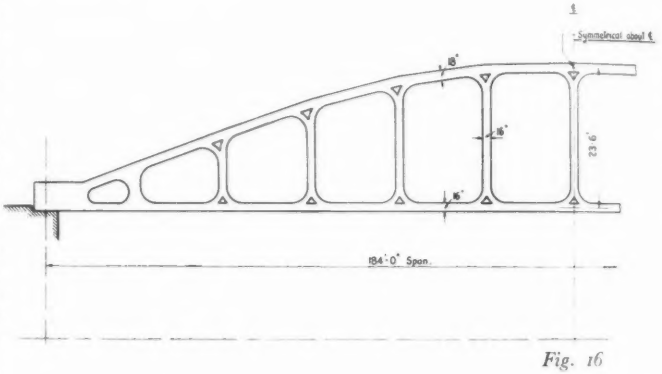


Fig. 16

As mentioned before, it has become customary to make use of the restraining effects of connections. In the design of the Vierendeel truss the stress analysis treats the connections between the chord and the web members as fixed or rigid, so far as angular changes due to deformation are concerned. The form of deformation of such a truss is shown in Fig. 14. It cannot be said that with equal maximum permissible primary stresses the Vierendeel truss can save weight over a normal triangulated truss, but its advantage lies in its application to particular problems, and these occur mainly in architectural work. It has, however, been used for many bridges on the Continent, where it has scored because of its attractive appearance and the greater use of welding, Figs. 15 and 16. It sometimes has advantages in theatres and commercial buildings, wherein steelwork has to be protected against fire by encasement in concrete and where large-span load-carrying girders are required more and more. The members of a lattice truss would either have to be encased individually or the whole truss encased in the form of a concrete box. This is expensive and leads to interference with architectural features, whereas with a Vierendeel truss the casing is similar to that of the normal beam and stanchion casing, which can suit the architectural treatment. Further, the Vierendeel truss can be constructed in reinforced concrete, the necessary fixities and monolithic construction being obtained by the usual pouring in situ.

The design, as with all continuous monolithic structures, is more complicated than with simple or "determinate" structures. The process is one of analysis and redesign, using the principles of slope-deflection with approximations that give a known degree of variation from complete and lengthy mathematical analyses that have been the subject of research in America, the Continent, and this country. A clear and concise explanation of design

methods was made by P. C. G. Hausser, the author's partner, in a paper read before the International Congress for Steel Development in 1935. Fig. 13 illustrates four trusses designed by the author's firm and made at Middlesbrough for a building in Pretoria. Perhaps this paper emphasises such terms as "monolithic," "continuous," "fixed end," etc., and refers mostly to what used to be called "indeterminate" structures. There was a saying once that "statical indetermination is always to be regarded as self-interference with efficiency," but there is little question that nowadays the drive towards economy and the greater use of reinforced concrete and welded structures (which are necessarily, and can be visualised as, monolithic or continuous), have forced a change in methods of design, which are now derived from analyses of structures that by earlier statics were indeterminate.

On the subject of foundations, it may be said that one foundation problem is seldom similar to another. A very large number of combinations can be found among various given conditions of soil, adjacent buildings, streets and sewers, shape of site, disposition of loading of columns, water conditions, and speed of construction. A general principle, however, is that settlement should be uniform. Since a stress must produce a strain, a settlement of some degree is inevitable, and the areas provided for column and wall foundations should be such that the stresses, and consequently the strains, or settlements, are equal. Here a degree of discretion is used from practical experience. For example, the load of internal columns is made up of a greater proportion of live load than external columns, the greater part of the load of the latter being the dead load of walls, etc. Consequently, the stress should be reduced on external column foundations relatively to internal column foundations. There is no rule concerning this, the degree of difference in allowable relative maximum stresses depending upon the type of building, the assumptions of loading in the basis of design, the type of loading, the character of the ground, etc. For example, in a heavily loaded warehouse most of the superimposed load can be considered dead load, whilst in a dance hall or office building the superimposed load is only on the building for a short while, and the assumptions of superimposed loadings are to cover peak loading. It must be remembered also in proportioning the areas of foundations that final settlement is not reached immediately (it may take years, according to the kind of ground), and that some settlement takes place during building, the load being thus applied gradually, which is frequently a safeguard against cracking due to initial settlement.

Further, the characteristics and rate of settlement must be the same for all columns and walls, or as nearly the same as possible. In other words, it would be unwise, for example, to found one part of a building on piles and another part on spread foundations; nor would it be wise to found one part on gravel and another on clay. It would not be wise to found—without considered safeguards—on material with a fluctuating ground water level. It can well be imagined that if water is removed from ground by some means the characteristics of such ground are changed; indeed, it is not the same ground without its normal content of water. This investigation and consideration of ground water is very important, especially in large cities, which are often located on the banks of a river that in earlier times had tributaries or swamps draining into it. These tributaries, swamps, inlets, etc., may now be underground, but the water courses are still there, and, according to the rainfall, etc., so the water content and level in the water courses will vary. It is important if founding upon water-bearing strata that the depth of foundation is either below the lowest water level, or else well above the highest.

In most cities there is some depth of made-up ground immediately below the ground level; it is the accumulation of centuries and is unsuitable for carrying heavy loads. Consequently, it is necessary to go to some depth to obtain a suitable foundation, and this, in combination with the necessity of obtaining the maximum accommodation, leads to the construction of basements, which involves retaining walls. In order to obtain the maximum floor space in a basement, retaining walls should be as thin as possible, depending upon the site conditions, and this leads to the use of reinforced concrete, since a mass wall generally takes up too much room. A usual type of retaining wall, therefore, has the shape shown in Fig. 17. The line AB is generally as far out from the building as the authorities will permit, and the distance D as great as safety will allow, so as to obtain the maximum

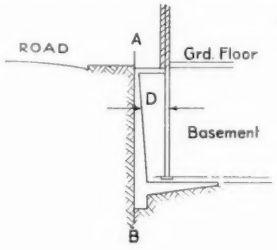


Fig. 17

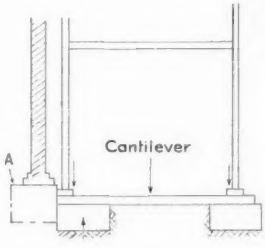


Fig. 18

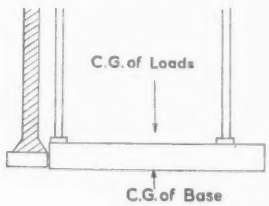


Fig. 19

accommodation in the basement. During the construction of the wall the road must be maintained, and consequently such walls are generally constructed in a trench surrounding the site, the strut loads being taken on a "dumpling" left on the building side of the trench. It is essential that there be no movement in the ground supporting the road, otherwise there is danger of the road surface and sewers and surfaces under it cracking due to a slight yield. To safeguard against this in the construction of deep retaining walls, the struts are sometimes jacked to exert a pressure against the ground, and sometimes a soil consolidation process is used, particularly when there are old buildings or old sewers near the trench. This is only done in exceptional circumstances, however, the usual procedure being to consolidate carefully with concrete against the earth during construction, so that there is no possibility of the earth loosening towards the wall.

In the design of such reinforced concrete cantilever walls, consideration must be given to possible deflection under load, since excessive deflection of a thin wall at the top might have this effect and allow a spreading of earth under the road. Modern high city buildings are generally framed in steel or reinforced concrete. When such a structure is constructed adjacent to an older thick-walled building, it often becomes necessary not only to construct suitable foundations for the new building, but to support, during construction, the older building, and to provide the adjacent old walls with new foundations. This problem, in combination with those of site conditions, is common. It is usual in commercial office buildings built to the maximum statutory height to obtain loads on external wall stanchions adjacent to an old party wall of the order of some 200 tons (the loads may vary from 100 to say 500 tons). These loads must be spread, and if the combination of the stanchion foundation and the old wall load, using normal methods, necessitates a foundation of a size that might interfere with possible building operations in the future when the old building is replaced, then it may become necessary to devise a scheme for new foundations that will not so interfere. In such circumstances there is an infinite variety of problems and solutions, but generally the principle of either cantilever or combined footings is used.

For example, if the footing under the wall, Fig. 18, cannot be projected to the point A, then the footing can be made eccentric, and the bending produced by such eccentricity taken by means of a cantilever, which is held down by an internal column. Alternatively, a combined footing may be used, when the external or internal columns are put on one foundation, the centre of gravity of which coincides with the centre of gravity of the two column loads, Fig. 19. In some instances more than two columns may be combined, using the same principle. Sometimes cantilever foundations may be very complicated and heavy.

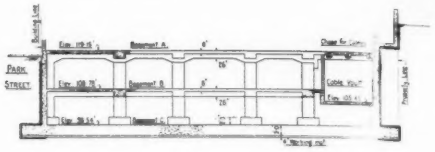


Fig. 21

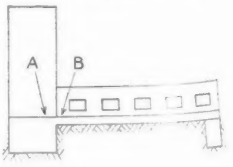


Fig. 20

If the variation in load exerted by parts of a building is so great that it is not economical or practicable to obtain a uniform stress on the ground, then the foundations must be so designed that the curvature, or relative settlement, is so small that the building can take up such curvature without cracking walls, plaster, etc. For example, if there is a heavy tower adjacent to a lightly loaded part of the building, Fig. 20, it may be extravagant to design both the heavily loaded and lightly loaded foundations for the same stress on ground at the same depth. It is often more economical to form the foundations of the light building so that they act as a beam resting on the tower foundations, and of such strength and flexibility that the curvature of the beam is slow enough to be taken up by the light building without damage. The connection between the two types of foundation prevents any relative settlement between A and B, which would probably occur if an uneven stress were put on the ground by foundations of the normal size.

If spread footings are not suitable in a building, due to weakness of the ground or any other cause, piled or raft foundations may be used. There are numerous types of pile, each suited to a particular problem; for example, it may be dangerous to use ordinary driven piles near old buildings, since the vibration due to driving may crack and damage the existing buildings. In such circumstances bored piles are used, the principle being that of boring a hole and filling it with concrete under pressure, the concrete pouring into any weak pockets in the strata, and making intimate contact with the ground surrounding the pile. The choice of a pile or its material may depend on the chemical composition of ground, since ground containing some sulphates, for instance, may have a deleterious action on the pile. If this is suspected, a chemical analysis is made of a sample of ground, obtained by boring, and it may be wise to construct the pile with aluminous cement concrete.

The most difficult problems in foundation work appear to arise either from the nearness and instability of old adjacent buildings, and/or the presence of

water-bearing ground of various kinds. So far as adjacent buildings are concerned, each case has its own problem, the solution of which requires ingenuity and experience. With water-bearing soils methods may be devised to obtain a good foundation even in running sand, taking care not to damage adjacent buildings by the withdrawal of water or ground during pumping; but with basements there is still the problem of keeping the water out, because, when the water level has built up again in the surrounding ground after construction, considerable pressure may be exerted against or through the basement walls. It has to be remembered, too, that it is static pressure, that is, the full head of water can be exerted through a small hole, or porous concrete walls. It may be necessary to provide considerable resistance to such water pressure in order to prevent water penetrating into a basement. If the basement is lined with a waterproof membrane, such as asphalt, then the asphalt must be kept in place by a structure sufficiently strong to withstand the water pressure without deflecting sufficiently to crack the asphalt membrane. In other words, the basement must be "tanked," and the resisting lining so attached to the building that the loads on the lining due to water pressure are resisted by the weight of the building. If anything occurs to break the waterproof membrane then water pressure may cause water to travel along underneath the lining for a considerable distance before it appears, making the position of the break very difficult to locate.

In conclusion, the construction and design of foundations in general depends so much upon conditions and individual experience that general principles and research do not apply to the same extent as they can in the design of the superstructure. There has been of late years research into soil mechanics, and the results have been of assistance. Investigations have been made into the distribution of stress in the ground beneath large spread foundations, beneath pile groups, and behind retaining walls, all for various types of ground, but such researches have not yet been sufficiently universal or complete to allow us to revise the present methods of design of foundations for normal city buildings in this country, so far as the ground and the distribution of stress in it is concerned. The advances lie mainly in the adaptation of modern materials, such as reinforced concrete, and the design of the lower parts of the building transmitting loads to the ground, Fig. 21.

The author of this paper is the senior partner in the firm of Messrs. R. T. James & Partners, who acted as consulting structural engineers for the R.I.B.A. building. Permission to reproduce the paper has been given by the Institution of Engineers and Shipbuilders in Scotland, who also lent the illustration blocks—EDITOR.

R.I.B.A. DRAMATIC SOCIETY'S PERFORMANCE

Given at the R.I.B.A. on 19 AND 20 MAY

The R.I.B.A. Dramatic Society have now added another feather to their cap with this year's production, which took place a fortnight ago and which nobly maintained the very high standard of acting which the Society commands.

First there was a curtain-raiser—"The Waxen Man," by Mary Reynolds—a tale of witchcraft in Cornwall not a hundred years ago. Miss Elma Thomas, who is now a well-established R.I.B.A. star, played most feelingly the girl who has laid a curse upon the man who has jilted her; and (what cannot have been an easy thing, in a short one-act play) created such a sense of doom that when she and her brother flee to a sea cave to escape from their neighbours, who have discovered her witchcraft, their death by drowning seemed as inevitable as her lover's death under her curse. Mr. Gilbert Kendrew's Joe, the child-like twin brother, whose innocent prattle is his sister's undoing, was also excellent.

With Garrick's "Bon Ton, or High Life Above Stairs," we passed from the supernatural to the superficial. This amusing farce of intrigue and counter-intrigue was played with great gusto and obvious pleasure by a cast the majority of whom are tried R.I.B.A. favourites. "Mrs." (in the eighteenth-century dramatic convention) Caldicott, especially, gave a performance full of grace and wit and was well matched by Mr. King's suavely unprincipled Lord Minikin. Miss (now "Mrs.") Thomas as the engaging young heiress, Miss Tittup, was a little more pert than flirty; but she is perhaps more suited to a tragic than a coquettish part. But to praise every performance would be merely to catalogue the cast: the smaller parts—Mr. Stamford's drunken Irish Davy, "Mrs." Smith's Gymp—were as surely played as the larger and with as much relish.

The sets by Messrs. Birch and Slaughter were cleverly designed for the shallow R.I.B.A. stage and the music by Miss Toni Sachs and lighting by Mr. Richard Carter and Miss Edyth Meikle's stage managing were of the same good order. In fact, honours all round, including the audience who displayed their excellent discrimination in seeing the plays: but it is a pity more members have not this discrimination! Hardly 200 people attended in the two nights together and the performances deserved packed houses.

PROGRAMME OF EXHIBITIONS ORGANISED BY THE R.I.B.A. EXHIBITION SUB-COMMITTEE

Below is the list of bookings for the four R.I.B.A. exhibitions now touring the country, up to February of next year. Of these, "Civic Centres" is shortly ending its run after having been on tour since the autumn of 1936. "Airports and Airways" will continue until the end of this year. It has been found by experience that the natural life of one of these touring exhibitions is between eighteen months and two years; that there are always three or four on tour simultaneously. Civic Centres will be replaced in the autumn of this year by a small exhibition on "the House."

During 1937 R.I.B.A. exhibitions were visited by 282,000 persons, an increase of 100,000 over 1936; a similar increase is anticipated for this year. These exhibitions represent a great work of public education in architecture, and on behalf of architects. This work would, however, be much more effective if each member of the R.I.B.A. regarded it as his or her personal concern—which indeed it is. The aggregate effect of all members themselves visiting, and pressing their lay friends to visit, exhibitions when in their neighbourhood would be immense. It should be realised that there is very little money available for publicity of the exhibitions, and this personal publicity is a contribution that every member can easily make.

Some Allied Societies have made the fullest use of these exhibitions, assisting the local museum or art gallery director in arranging them, meeting Press representatives, conducting parties of schoolchildren or local societies round them, etc. Others, however, give no official help or recognition of this work on their behalf.

In asking for this support by members, the Exhibition Sub-Committee are not urging them to undertake a merely dull duty. Although intended primarily for laymen, the exhibitions are intensely interesting to architects, containing, as they do, illustrations of the newest types of building, collected from all parts of the world. The exhibition handbooks also are specially designed to serve as useful references, and are, therefore, worth purchasing and keeping. Further, the handbooks are the only source of revenue available for the organisation of exhibitions.

DATES AND LOCATIONS

Dates	*Exhibition*	*Centre*
6 May-17 June	Airports and Airways	Wolverhampton, Museum and Art Gallery
17 May-21 June	Civic Centres	Leicester, Museum and Art Gallery
23 May-11 June	Modern Schools	Bradford College of Arts and Crafts
1-24 June	Health, Sport and Fitness	Bristol, Museum and Art Gallery
22 June-13 July	Modern Schools	Blackburn, Public Library, Museum and Art Gallery
1 July-1 Aug.	Airports and Airways	Sunderland, Public Library, Museum and Art Gallery
1-23 July	Health, Sport and Fitness	Manchester, City Art Gallery
22 July-10 Aug.	Modern Schools	Birkenhead or Gloucester (not yet fixed)
30 July	Health, Sport and Fitness	Birmingham, City Museum and Art Gallery
13 Aug.-16 Sept.	Airports and Airways	Brighton, Public Libraries, Museums and Fine Art Galleries
21 Aug.-15 Sept.	Modern Schools	Carlisle, Public Library, Museum and Art Gallery
5 Sept.-4 Oct.	Health, Sport and Fitness	Halifax, Bankfield Museum
20 Sept.-11 Oct.	Modern Schools	Newcastle, Laing Art Gallery and Museum
1-31 Oct.	Airports and Airways	Barking, Eastbury Manor House
20-27 Oct.	Health, Sport and Fitness	Coventry
21 Oct.-12 Nov.	Modern Schools	Exeter, Albert Memoria Museum
15 Nov.-2 Dec.	Health, Sport and Fitness	Blackburn, Public Library, Museum and Art Gallery
21 Nov.-12 Dec.	Modern Schools	Darlington, Edward Pease Public Library and Museum
1939		
1-15 Jan.	Modern Schools	Belfast, Art Gallery
2-28 Jan.	Health, Sport and Fitness	Eastbourne, Towner Art Gallery
8 Feb.-1 Mar.	Health, Sport and Fitness	Gateshead, Shipley Art Gallery
13 Feb.-11 Mar.	Modern Schools	Kidderminster, Public Library, Museum and Art Gallery

Book Reviews

SIR REGINALD BLOMFIELD ON VAUBAN*

In the brilliant military history of France there is no more attractive figure than that of the great engineer of Louis XIV. It is no exaggeration to call him the greatest of all military engineers. It is hard to think of anyone but Todleben who comes anywhere near him, and even his reputation is based almost entirely on two great exploits—one of defence, one of attack.

In an almost incredibly active career of over 50 years Vauban never failed, and if Louis XIV had had the wisdom to accept the advice of his most disinterested servant his reign might have closed in triumph instead of the deepest humiliation. In technical skill Vauban stood far ahead of all his contemporaries. We think of him chiefly as a great designer of fortresses, but he was also the Demetrius of his time, the greatest taker of fortresses.

Sir Reginald's hand has not lost its cunning, and he has given us a fascinating picture of a very lovable human being. The book is a marvel of erudition and research, and, though packed with necessary technical detail, there is not a dull page in it. To British readers, perhaps the most surprising feature is the revelation of Vauban's fearless statesmanship. He saw more clearly than any of his contemporaries what was wrong with France during the glittering reign of *Le Roi Soleil*. The suicidal folly of the Huguenot policy, the corruption, waste, and economic danger of the taxation system, the sufferings of the great mass of the French people, upon whose labours the whole structure in the end depended. If he had been listened to, it is not too much to say that there would have been no Revolution, no Napoleonic era, and the whole history of Europe would have been changed.

In a second edition, which we hope will soon be called for, some small slips might be corrected.

Turenne's army of invasion in 1672 numbered 120,000, not 180,000. There was no such person as the Emperor of Austria in 1688. The first Emperor of Austria took the title in 1806.

Tabor is in Bohemia, not Silesia.

The French did not lose 27,000 killed at Blenheim. The true figure was not above 10,000. The 8,000 wagons that accompanied Löwenhaupt's army in 1709 were not the baggage train of an army of 15,000 men. They formed an immense convoy of provisions which Löwenhaupt was escorting to relieve the starving army of Charles XII.

It is going too far to say that the only method of attack against a mediæval castle was the use of various forms of missile weapons and the escalade. Sapping was constantly employed with success. Nor is it quite true to say that in the sixteenth century the effect of gunpowder was an " unknown quantity "—" imperfectly known," perhaps.

There does not seem to be any reason for doubt as to the meaning of " chemin couvert." Sir Reginald says on p. 47 : " Why the ' chemin couvert ' was so called, I do not know, for it was never covered." It was " covered " from fire in front—hence the name. Sir Reginald's own glossary of technical terms (p. 201) makes this point quite clear.

On p. 75 " 36 guns, from 12 to 24 charge " is a curious translation. Possibly it means " 12 to 24 pounders." " Tir-à-Ricochet " is surely not quite the same as " plunging fire." Sir Reginald himself explains the method and object of the " ricochet " on p. 110. Tin is a very expensive metal. It does not seem likely that the French really used it to cover their mantlets (p. 202).

" Philisbourg " is an unusual spelling of " Philipsbourg," but it occurs so often that it must be intentional. After all, it was " Philip's " town.

One small complaint. Quotations, which occupy a great deal of space, are practically all in Vauban's own rather original French. For British readers more translation would be welcome. But all these are very minor blemishes in a delightful work.

* *Sebastian Le Prestre De Vauban, 1633-1707.* By Sir Reginald Blomfield, R.A., F.S.A. (Past-President). 8vo. vii+216 pp. London : Methuen. 1938. 15s. net.

SLUMS AND HOUSING

Miss Denby's Comparative Survey of European Housing*

Europe Rehoused covers the whole immense field of working-class housing from an administrator's point of view. About equal consideration is given to questions of the growth and movements of population and the development of housing problems, financial policy, building agencies, attempts at constructive town planning, traditional standards for family and social living, and the types of housing achieved, including details of equipment.

The book is in three parts. Firstly, there is a short account, taking Europe as a whole, of the shortage to be dealt with and of the financial problems confronting housing authorities. This section states most vividly what are, in Miss Denby's opinion, the basic essentials for a successful housing policy, and it is interesting that these conclusions should result from her long experience in the subject. They are : the minimising of interest and amortisation charges, the prevention of speculation in land and in building materials, and the establishment of an efficient substitute for private enterprise as a building agency.

Secondly, housing in Sweden, Holland, Germany, Vienna, Italy and France is comparatively fully described. In this section, which is the main body of the book, there is a lively and readable mixture of a traveller's impressions with a popularisation of the underlying theories of planning which were followed and with more impersonal information obtained from literature and interviews with officials. This method permits very sympathetic descriptions of particular buildings, and pointers on the character of places visited ; as, of a Swedish co-operative scheme, " Living rooms are very large, with one wall almost all glass. . . . This gives an exceptional feeling of space in the room, the more so that the view is enchanting ;" and of an Italian " hotel " for unsatisfactory tenants : " The general standard of cleanliness, homeliness and taste seemed very high, though naturally one or two families are dirty, and they are said to be on the whole a blasphemous crowd " ! Again, we are told of the Garchy system of refuse disposal, in use at Bagneux, that " there was no smell from the sink in any of the many inhabited flats . . . nor had the tenants any criticism, although the system had been in use there for over six years." This humanistic approach also led Miss Denby to examine the facilities available for social and recreational much greater life, and to describe the importance attached to this aspect of housing abroad. She notes of Vienna : " But the inevitable smallness of the dwellings was offset by their being surrounded by ample space . . . and by the municipality providing the tenants with everything necessary for a full communal life, such as infant schools, club rooms, gymnasiums, laundries, playgrounds and gardens. That is to say, the City Council concentrated on the needs of the children, on the encouragement of companionship and the general health of the tenants."

Supplementing this type of information there are detailed and objective notes on the attempts in each country to secure sufficient planning powers and cheap enough money, land, and building. The aim was most nearly attained in Vienna, of which Miss Denby says " this method of finance has never in my opinion been properly appreciated or even fairly described." But since this system was not able to maintain itself it is a great disappointment that the book should ignore Russia, the European country which, according to her conclusions, should be of the greatest interest.

A similarly analytical approach has not been applied to the architectural side of housing. Indeed, the book is non-technical in the sense that there is no appreciation of the contribution to housing standards made by, for instance, the geometry of planning or by the necessary conditions for economical use of modern equipment. Thus she states : " Many of the French housing experts insist that the height of buildings is immaterial so long as they are surrounded by sufficient space for the sun to penetrate into all the rooms." The figures for the scheme mainly referred to†—Drancy-la-Muette—show that, in order to keep the standard of open space constant, the density was lowered from 225 persons per acre in the towers to 155 in the three- and four-storey blocks. Is this immaterial ? The examination of evidence on height of building as related to convenience and provision of sun and air is similarly superficial in the notes on Germany. Here the popularity of three-storey flats, with large balconies, as against six-storey flats without lifts or balconies, is quoted as the reason for the authorities being, in their own words, " very scornful of the then fashionable craze for housing large working-class families in 'sky-scrapers' " ! The value of concentrated building with full equipment in the re-development of central areas was recently emphasised in Mr. Livett's talk to the Architectural Association on his work at Leeds, and such practical results can only be refuted by far more definite criticisms than those referred to above. Moreover, one cannot help comparing Miss Denby's observations on the quality of dwellings with Catherine Bauer's admirable analysis and list of requirements and minimum standards to ensure them, to which Miss Denby does not refer.

**Europe Rehoused.* By Elizabeth Denby, with a foreword by Lord Horder. 8vo. 284 pp. + 32 plates. London : Allen and Unwin. 1938. 14s.

† " Housing." The Building Centre ; 1936.

Thirdly, in the summary and conclusions, modifications of English policy are suggested. It is remarked that an acute problem either of overcrowding or of insanitary dwellings, or both, remains for the poorer workers in each country visited; that in Britain the system of subsidies is more extravagant, and results in a greater expenditure on land and materials, than in other European countries. It is suggested that land speculation should be prevented, and that since much of the national income must now be spent on "defence," it is time, by more collaborative methods, to spend "brains instead of money." How this economy is to solve the housing problem is not clear.

Miss Denby also points out that in Britain a greater flexibility in replanning is possible because of the lower average density of our cities.

Most important, however, Miss Denby has found that "in Britain flat life is interpreted at its crudest and lowest level." The standard of living of the British worker in his house with garden was not maintained when he was forced into a flat shorn of the social facilities and equipment which should accompany it. She asks: "What are naturally included as components of urban continental life? . . . Cafés, restaurants, fun fairs, playgrounds and parks have long been thought essential in every town, a necessary compensation for the lack of privacy, of home-life and home-entertaining which has been possible for the humblest English cottager." Her sympathetic understanding and descriptions of life on continental estates fully support this conclusion.

JUSTIN BLANCO WHITE

URBAN BLIGHT AND SLUMS*

In England we are greatly lacking in facilities for scientific research into urban economics. One consequence of this deficiency is that our housing and town planning policies and methods are based on weak foundations of knowledge, and are influenced too much by scrappy information derived from isolated experiences and superficial investigations.

A new book on Urban Blight and Slums, by Dr. Mabel L. Walker, of New York, is witness to the fact that Americans are much more thorough than the English in studying the underlying causes of urban disorders.

The book is one of a series of comprehensive town planning studies prepared under the editorial guidance of Professor Henry V. Hubbard, of the School of City Planning at Harvard. The sponsors of Dr. Walker's study are Mr. Harold L. Buttenheim and Mr. Lawson Purdy, who state in a foreword that the special object of the work is to focus attention on "the relationship of fictitious land prices and of methods and incidence of taxation to the other and more generally recognised factors" in problems of decadent districts.

The book contains chapters by six other authors, who are not in complete agreement, and extensive quotations which might have been abridged with more gain than loss. The late Henry Wright and Mr. Clarence Perry are responsible for valuable constructive proposals on planning aspects, and Mr. A. C. Shire for an excellent discussion of the subject of Rationalisation of the Home Building Industry. The absence of an index is a serious defect in a book that is so largely a compilation of ideas and facts from many sources.

Notwithstanding the wide field it covers, one is compelled to agree with Mr. Ira S. Robbins, who is author of Chapter XVII, that factual studies need to be undertaken by State, county and municipal planning agencies, showing the results of deterioration in any area, year by year, to enable sound conclusions to be arrived at regarding practical and effective remedies. This statement indicates the difficulty and immensity of the problem. It is doubtful if the results of the study do more than slightly strengthen the views already held by Mr. Buttenheim and Mr. Purdy, two of the best thinkers on housing policies in the United States. Certainly the best statements of principle in the book are those quoted from these two sponsors in Chapter XXVIII. In effect these principles are that:

(*a*) The preparation of a general plan of the city is an essential preliminary to the solution of problems of parts that are blighted.

(*b*) The general plan must take into account the character of use for which land is adapted.

(*c*) The solution of problems of blighted areas involves assemblage of large plots, reservation of new open spaces, replanning of streets, and existence of facilities for disposal of surplus land.

One of the main causes of the blighted areas of cities, i.e., areas that are subject to economic deterioration, is expressed by the author with frequent reiteration as the holding of land by owners for prices "which are greater than justified by the uses to which the property can appropriately be put." This is a view that has been frequently expressed by the present writer as a result of experience of blighted conditions in London and New York. It is a view which has received too little attention by the high authorities responsible for the English legislation, in which too much support is given to the maintenance of high land prices, by means of extra subsidies for building blocks of flats on expensive sites. Nevertheless, if Dr. Walker is right in her main contention that the crux of the problem is the discrepancy between land prices and appropriate and economical uses of land, then perhaps the greater part of every

**Urban Blight and Slums. Economic and legal factors in their origin, reclamation, and prevention.* By Mabel L. Walker with special chapters by others. La. 8vo. xvi+442 pp. Cambridge, U.S.A., Harvard Univ. Press: London, Milford. 1938. 17s.

large town, and not merely blighted areas, is subject to this discrepancy.

The attempt in one chapter to show that the blighted areas of cities conform to a pattern that may be expressed in diagrammatic form is not successful. Blighted areas have too many origins and present too great a variety of conditions, as this work itself reveals, to enable it to be said that they spread in any typical way.

One factor that is not sufficiently stressed in the book is that the most general first cause of blight is that of the inevitability of decay of parts of cities as a result of physical deterioration plus social change. To meet these changes, cities would require to rebuild themselves every 40 to 100 years, and the rebuilding would still be preceded by a period of transition which partially and unavoidably is a blighted period.

Dr. Walker gives a table of the Bureau of Internal Revenue of the United States Treasury, showing that the useful economic life of residential buildings varies from 25 to 50 years. Probably, however, if buildings were properly constructed, it would be reasonable to expect an average life of 50 to 100 years. Compulsory insurance of the life of buildings, to which brief reference is made, would go a long way to solve the problem of blight.

Social changes that cause blight include change of fashion in dwellings, higher cost of domestic services, tendencies towards labour-saving, and reduction of size of families. Technological changes that overlap with social changes are illustrated by the effect of the motor-car—which has both altered the conditions of travel and caused income to be diverted from the maintenance of a home to the maintenance of a vehicle. Changes due to economic conditions include pressure of business and industry into residential areas as cities expand.

The implications of Dr. Walker's conclusions are that the losses due to these changes should be borne more largely than under present conditions by owners of the property, in the form of depreciated land prices, and that it is by attempting to avoid these losses, invariably with success, that the really bad conditions of blight are caused.

The book contains a good descriptive chapter on law and practice connected with housing and slum clearance in England and Holland. Perhaps the most valuable contribution of the principal author consists of the chapters on Property Taxes, Tax Exemption, and other economic and legal aspects of the problems connected with land development in American cities.

As a whole, the book constitutes a valuable work of reference to the student of housing in England and the United States.

THOMAS ADAMS [*F.*]

TECHNICAL BOOKS

E. & O. E. 1938

PLANNING: AN ANNUAL NOTEBOOK. *By E. & O.E., 1938. Sm. fo. 358 pages. London: Architect and Building News. 1938. 6s.*

In his foreword to the new edition of E. & O.E.'s pantechnicon of knowledge, Mr. Goodhart-Rendel says that the authors have provided "what all architects *should* have—but too few *have* had—the habit of providing for themselves." Which is, presumably, a repetition of the usual complaint that pepnotised foods atrophy the digestive organs. It is indeed a perfectly fair complaint, despite the fair enough answer that can be made that the architect to-day has so much more to digest than his forebears that unless some of his diet is pre-digested he will suffer from all the complaints of those who cannot assimilate their food.

One day—perhaps it won't be until E. & O.E. give up their seemingly endless research—they will give, in the last edition of their book, a chapter which will undoubtedly be the most valuable of all, "How we did it." Anyone who is concerned with the routine business of collecting and distributing information must be amazed at the thoroughness, within the closely defined limits they have set themselves, of E. and O.E.'s inquiries. The tyro who just reads all they have to say and uses it because, as Mr. Goodhart-Rendel suggests, he is too lazy or busy to find it out for himself, may think that E. & O.E. just work it all out in their heads, little appreciating the extent of the work involved; the references that they must make to official publications, general and specialist works, and to the evidence provided by erected buildings. There is no more valuable stock-in-trade for an architect than his sources of information, and none more closely guarded. But the degree of improvement that all want to see in the technical competence of contemporary architecture will not be attained until each individual in the profession is infinitely more prepared than he is at present to "work things out from the beginning"; not merely to rely on even the best established formulæ and precedents. This does not necessarily mean more than the cultivation of a healthy scepticism, a constant enquiry: Where was that done? Who did it? and who said so? Only by cultivating a power of analysis and discrimination can any architect get beyond the stage of simple reliance on written authority.

Some years ago an architect who was by far the most successful designer of his time of a certain type of building wrote a book on the planning and equipment of that type of building, generously and efficiently including everything he knew. After he had written his book, he continued his researches and in the course of time knew very much more than he had been able to publish, but his work was *the* standard text-book used by practitioners and competition assessors, who thus knew as much and no more than he knew in 19—. The author, so the story says, thereafter won no more competitions because his improved technique was unorthodox, it did not conform to the standard which he had unwittingly laid down some years earlier. This is probably a story and

nothing more, but it does illustrate what is an entirely real danger.

This edition of the Planning Notebook has new chapters on Law Buildings, Fire Stations, Museums and Art Galleries, Sports Pavilions, Office Buildings, and Crematoria. These are all of the same high standard as the previously published chapters. The Law Buildings chapter includes a section on police stations and prisoners' cells, in which no mention is made of heating, one of the most important details in the planning of a small living compartment, and one that has been neglected in past practice. Heating is one of the few elements of planning and equipment which generally in the book receives inadequate attention, though any thorough study of it would, perhaps, have extended the scope of the authors' analysis further into the realm of mechanical equipment than they have ever claimed to do.

In the Museums and Art Galleries chapter it is stated that rooms designed to provide proper lighting for pictures are unlikely to be required for the display of furniture, panelled rooms, or ceramics in cases. This is not by any means true. Increasingly, museum practice requires the provision of mixed exhibit galleries, as, for instance, in parts of the Fitzwilliam Museum at Cambridge. It is certainly difficult to give good lighting for pictures and for objects together, but it can be and has been done.

Several of the old articles have been revised in detail. The Shops and Stores article mentions the requirements of the Ribbon Development Act that "draw-in" facilities should be provided, but does not unfortunately give a reference to a later chapter on planning for the motor vehicle, in which there is a good section on the ways in which this can be done.

The new volume has about 50 pages more than its predecessor. The pagination is peculiar and inconsistent; sometimes title pages to chapters and the blank pages between chapters are included, sometimes not, and sometimes advertisement pages are given printed numbers out of series, although they are included in series.

E. & O.E. have done their work marvellously well, and their publishers have contrived to produce it at a price within the reach of all. Those who fail to obtain the book will be failing to make the best investment of six shillings that it is easily possible to imagine.

A MANUAL OF CENTRAL HEATING AND HOT WATER SUPPLY

CENTRAL HEATING AND HOT WATER SUPPLIES FOR PRIVATE HOUSES. *By G. C. Sanford. 2nd ed. Sm. 8vo. viii+172 pp. London: Technical Press. 1938. 6s.*

This subject, which is assuming greater importance in the eyes of the building owner every year, is dealt with excellently and thoroughly in this handy sized volume by a well-known authority.

It is, perhaps, a conservative volume and those architects who are in the habit of knowing about the mechanical side of their buildings will find nothing new; but besides instruction will be found all the tables necessary for the complete working out of any installation described in the book. There is one recommendation, however, for which there seems to be very little scientific justification. In certain cases an extra hot-water tank is recommended at the top of the secondary circulation with the intention of improving the supply of hot water at high level. It is extremely doubtful if this tank serves any useful purpose so long as the cold feed to the system is large enough. The extra volume recommended at high level would be better placed in the storage cylinder as close as possible to the boiler. It is, however, important in all systems to avoid the common error of fitting an inadequate cold feed.

The contents of the book are in two parts—central heating and hot-water supply. The first deals in Chapters I to IX with a number of general matters, the measurement of heat, heat transmission, pipe resistance boilers, fuel consumption, etc.; and in Chapters X to XVII with central heating systems which are all illustrated by diagrams. In the second part (Chapters XX to XXXI) the details of planning hot-water supply are discussed and systems illustrated.

Those architects who are in the habit of taking their pipe sizes for small installations from old specifications leaving the general scheme to the local builder would be well advised to present a copy of this book to the men they employ. It is, perhaps, to this section of the building industry and to students rather than to practising architects that the book would have most value. To these, or anyone who wishes to master the principles of this very important, though unexciting, subject it is to be highly recommended.

E. PLAYNE [*A.*]

NEW SCHOOLS IN GREECE

ΤΑ ΝΕΑ ΣΧΟΛΙΚΑ ΚΤΙΡΙΑ (NEW SCHOOL BUILDINGS). *Edited by Patrocles Karantinos. Sm. fo. 295 pages. Athens: Chambre Technique de Gréce. 1938.*

This collection of photographs of modern schools in Greece is extremely interesting to those who wish to gain an idea of the types of school architecture in other countries. It is unfortunate that the plans that are shown are so small, and so few in number, as it is impossible to form a clear idea of the system of administration, and so makes it difficult to criticise the buildings as schools. From what can be gathered the main planning of units does not vary very much from the system used in this country except that there is a marked lack of practical rooms, while the plans are usually adapted to extremely uneven sites, making it impossible to provide for playgrounds to the extent that we are used to. There are many interesting examples of a very severe modern style of architecture, but their setting in the rather barren surroundings gives them a bleak appearance that is lacking in human association. The most interesting feature is the form of gymnasium used; these consist of large covered porticoes with walls on three sides and completely open on the fourth and equipped with the usual apparatus. These open units make a very pleasing feature that can be seen in nearly every example and might be used here in our open-air schools. The interiors appear to be open and large, while the entrance halls, staircases and corridors are on a much more generous scale than is the usual practice here. Judging from the quantity and appearance of the buildings the recent programme for new schools has been very large. As a comparative record of the type of school buildings now being built in Greece, it is extremely good. Its interest would be increased if the examples could be compared with similar records from other countries.

D. C. H.

Accessions to the Library

1937-1938—XI

Lists of all books, pamphlets, drawings and photographs presented to, or purchased by, the Library are published periodically. It is suggested that members who wish to be in close touch with the development of the Library should make a point of retaining these lists for reference.

Any notes which appear in the lists are published without prejudice to a further and more detailed criticism.

Books presented by publisher for review marked R.
Books purchased marked P.
**Books of which there is at least one copy in the Loan Library.*

ARCHITECTURE

PALLADIO (ANDREA)
I Quattro libri dell'architettura. 1570. [Russian.]
Chetire knigi ob arkhitekture. Andrea Palladio. *etc.* V perevole Akademika Arkhitekturi I. V. Zholtovskogo.—V Lvukh Tomakh. (Klassiki teorii arkhitekturi pol obshchei *series*, redaktsiei A. G. Garichevskogo.) (*With reproduced title-page of original edition.*)
13″. Moscow: Akademii Arkhitektyri. 1936.
Presented by the Union of Soviet Architects.

THEORY

O'NEILL (F. R.)
The Relation of art to life. A sketch outline of an art philosophy. (Psyche monographs, No. 10.)
8½″. 232 (incl. xi) pp. Lond.: Kegan Paul. 1938. 5s. P.

ATKINSON (G. A.)
The Middle way. Being a study in architectural development. (Essay Medal, 1937, honourable mention.)
typescript. 12¾″. 1937.
Presented by the Author.

HISTORY

SAAL (BERNHARD)
Das Stettiner Wohnungswesen im 18. jahrhundert. *&c.* (Dissertation . . . Technischen Hochschule, Berlin.)
11¾″. 137 pp. Stettin: Ostsee. 1938.
Presented by the Librarian of the Patent Office.

WIRTH (ZDENEK)
Kutná hora. Mesto a jeho umeni [the town and its art].
9″. Prague: Nové Edice. 1912. *Presented.*

CONGRÈS INTERNATIONAUX D'ARCHITECTURE MODERNE (C.I.A.M.)
*5e congrès, Paris, 1937. (Livre du ——.) Logis et loisirs. Urbanisme [19]37. (Collection de l'équipement de la civilisation machiniste.)
10″. Boulogne-sur-Seine: L'Architecture d'Aujourd'hui. [1938.]
Presented by M. Le Corbusier, and P.

ARCHITECTURE VIVANTE, *journal, publ.*
Le Corbusier. Œuvre plastique. Peintures et dessins; architecture.
pfo. 10¾″×8¾″. pp.+pls. Paris: Morancé. [1937 or -38.] (£1 1s.) P.

FLORIDA ARCHITECTURE AND ALLIED ARTS
*——.1938 issue.
sm. fo. Miami. 1938. R.
To Loan Library.

LOUKOMSKI (G. K.)
*I Disegni del Palladio a Londra. [Burlington-Devonshire collection at R.I.B.A.] (*From* "Palladio" *journal*, i.)
12¾″. 12 pp. Milan: Hoepli. 1938.
Presented (2) by the Author.

BARRY (*Sir* CHARLES)
The Work of Sir Charles Barry, R.A. (period 1839-1847. [drawings] as traced by James Murray and mounted [in] . . . volumes. —— A Catalogue of the drawings, annotated, and with a notice of the career of James Murray . . . (1819-98), and a note on the works of Sir C— B— . . . 1839-47. [Compiled and written] By A. T. Bolton.
MS. 13″. (Bound.) [1938.]
Presented by the Compiler, F.S.A. [*F.*]. *Curator of Sir John Soane's Museum.*
The drawings referred to are in 3 fo. vols., presented [to the Library Feb. 1935.

HEWITT (GRAILY)
Handwriting. Everyman's craft.
8½″. xi+157 pp. Lond.: Kegan Paul. 1938. 10s. 6d. P.

PROFESSIONAL PRACTICE

DICKSEE (BERNARD)
*The London Building Acts 1930 and 1935. Supplement [to The London Building Act 1930] with bylaws *etc.*
8″. x+192 pp. Lond.: Stanford. 1938. 12s. 6d. R. & P.

PLANNING

E. AND O.E., *pseud.*
*Planning. An annual notebook. 1938.
13¼″. Lond.: Architect & Building News. 1938. 5s. R. & P. (2).

BUILDING TYPES
(CIVIL)

OFFICE OF WORKS: DEPARTMENT OF ANCIENT MONUMENTS AND HISTORIC BUILDINGS
Official guides:—
Kew Palace. By R. S. Simms.
pam. 8½″. Lond.: H.M.S.O. [1934.] 2d. *Presented.*

BLOMFIELD (*Sir* REGINALD)
*Sebastien le Prestre de Vauban [military engineer] 1633-1707.
8½″. xv+216 pp.+pls. Lond.: Methuen. 1938. 15s. R. & P.

MINISTRY OF HEALTH: DEPARTMENTAL COMMITTEE ON THE COST OF HOSPITALS AND OTHER PUBLIC BUILDINGS
Final report.
9¾″. Lond.: H.M.S.O. 1938. 2s. R.

NEW YORK: MUSEUM OF MODERN ART
Exposition architecture. (Bulletin, vol. 4, 3, Jan.)
pam. 9¼″. [New York.] 1936. R.

ILLUSTRATION (L'), *journal*
——.14 Aug.: Exposition de Paris 1937.
——.[Suppt.] Exposition de Paris 1937. Arts et techniques.
—each 15″. Paris. 1937.
Presented by Mr. E. L. Bird [*A.*].

KNOOP (DOUGLAS) *and* JONES (G. P.)
London Bridge and its builders. . . . municipal employment [of masons mainly in the fifteenth century. (*From* Trans. Quatuor Coronati Lodge, xlvii, 1934.)
11¼″. 40 pp. n.p. [193—.]
Presented by the Authors.

(RELIGIOUS)

INCORPORATED CHURCH BUILDING SOCIETY
Annual report: 120th, for . . . 1937. *With article* Modern churches and new materials, by Charles Spooner. Illustrated section of new churches.
1938. R.

STOCKHOLM : HÖGALIDS CHURCH
Högalidskyrkan. Minnesskrift *etc.*
11½″. 27 pp.+pls. Stockholm : Norstedt. 1923.
Presented by Mr. Basil Oliver [*F.*].

DABEERT (HERMANN)
Die Monolithenen kirchen Lalibelas in Aethiopien. (Dissertation . . . Technische Hochschule, Berlin.)
8¼″. 120 pp. Berlin : Triltsch & Huther. 1938.
Presented by the Librarian of the Patent Office.

ARTHUR (E. R.)
St. Andrew's [Presbyterian] Church, Niagara-on-the-Lake. (Toronto University : School of Architecture.)
12″. 28 pp. Toronto. 1938.
Presented by the Author, M.A., B.ARCH. [*A.*].

OTTMANN (FRANZ)
Professor Clemens Holzmeister. [Crematorium, Vienna, &c.] (*From* a German periodical.)
extract. 12″ n.p. [193—.]

(EDUCATIONAL)

FRETWELL (W. E.)
The Heating of schools.
pam. 8½″. n.p. [1938.]
Presented by the Author, F.R.S.I.

INTERNATIONAL INSTITUTE OF INTELLECTUAL COOPERATION
Mission sociale et intellectuelle des bibliothèques populaires. Son organisation. Ses moyens d'action. (Dossiers de la coopération intellectuelle.) [Sections on library buildings, pp. 34 & 184.]
8¾″. 444 pp. Paris. 1937. *Presented.*

(DOMESTIC)

GROHMANN (HANS), *editor*
Das Zeitgemässe holzhaus. Sein bau und seine raumgestaltung. [With chapter on] . . . baukosten von holz- und massivbau von . . . E. K. Hengerer.
10¾″. 102 pp. Munich : Knorr & Hirth. 1938. 7s. 6d. P.

NATIONAL HOUSING AND TOWN PLANNING COUNCIL
[Pamphlets.] pams. v.d.

DENBY (ELIZABETH)
*Europe re-housed.
8½″. 284 pp.+32 pls. (backed). Lond. : Geo. Allen & Unwin. 1938. 14s. R. & P.

NEW YORK : MUSEUM OF MODERN ART
Architecture in government housing. [Exhibition.]
dupl. typescript (printed cover). 11″. [New York. 193—.] R.

MINISTRY OF HEALTH
Housing (Financial Provisions) Act, 1938. Circular 1704.
leaflet. 9¾″. Lond. 1938. R.

DEARN (T. D. W.)
Sketches in architecture ; consisting of original designs for cottages and rural dwellings, *etc.*
[1st ed.] fo. London. 1807. (£1 10s.) P.

PADÁNYI (GULYÁS J.)
A Fertö vidék népének épitészete. [Rural architecture in region of Lake Fertö.]
10¼″. xv+113 pp. Budapest : Magyar Ház Barátainak. 1937.
Presented by M. Padányi Gulyás Jenö through Mr. E. J. Carter [*A.*].

NATIONAL HOUSE-BUILDERS' REGISTRATION COUNCIL
Model specification &c. (Appendix i *of a larger work.*)
extract. 12½″. [193—.]

INTERIORS

JANNEAU (GUILLAUME)
Le Style directoire [c. 1790-1803]. Mobilier et décoration.
pfo. 12¾″. 62 pp.+48 pls. Paris : Moreau. [193—.] 18s. 6d. P.

ALLIED ARTS AND ARCHÆOLOGY

SOCIÉTÉ DES ARTISTES DÉCORATEURS
Pavillon S— des A— D—. Exposition Internationale Paris 1937.
12½″. (vi)+(xv) pp.+pls. [Paris. 1937.]
Presented by Mr. E. L. Bird [*A.*].

LONDON (KURT)
The Seven Soviet arts. E. S. Bensinger, trans.
8½″. xi+381 pp.+pls. Lond. : Faber and Faber. 1937. 15s. R.

BRITISH MUSEUM
Assyrian sculptures in the British Museum from Shalmaneser III to Sennacherib.
12¼″×10″. 19 pp.+lxix pls. Lond. 1938. £1 7s. 6d. P.

SOCIETY OF ANTIQUARIES OF SCOTLAND
Proceedings. Session 1936-1937. Vol. lxxi ; 6th series, xi.
1937. R.

ATHENS : BRITISH SCHOOL AT ATHENS
Annual. No. xxxv. Session 1934-1935.
Lond. 1938. R.

CYPRUS : DEPARTMENT OF ANTIQUITIES
Report. 1936—Part i. (By P. Dikaios.)
Nicosia. 1938. R.

BRITISH SCHOOL OF ARCHÆOLOGY IN EGYPT *and* EGYPTIAN RESEARCH ACCOUNT
42nd year, 1936. Anthedon, Sinai. By [W. M.] Flinders Petrie. With chapters by J. C. Ellis.
12¼″. Lond. : B.S. of A. in E. ; Quaritch. 1937. R.

EXETER : EXETER EXCAVATION COMMITTEE
Report. [Roman remains.] (*From* Proc. Devon Archæological Exploration Society, ii.)
9¾″. Exeter. [1937 or —38.]
Presented by Mr. Percy Morris [*Ret. F.*].

BUILDING SCIENCE

SPECIFICATION, *annual*
*——. 1938. 40th year. F. R. S. Yorke, ed.
1938. 10s. 6d. R. & P.

MATERIALS

COPPER DEVELOPMENT ASSOCIATION
Copper pipe-line services in building. (Publication No. 25.)
9¾″. 117 pp.+pls. Lond. 1938. R.

CONSTRUCTION

CARTER (CYRIL) *and* HIDDEN (H. R.)
Wall and floor tiling.
9¾″. xii+268 pp.+pls. Lond. : Caxton Pubg. Co. [193—.] £1 5s. P.

KNOOP (DOUGLAS) *and* JONES (G. P.)
The Impressment of masons in the middle ages. (*From* Economic History Review, Nov.)
pam. 10″. n.p. 1937.

SANITARY SCIENCE, EQUIPMENT

SANFORD (G. C.)
Central heating and hot water supply for private houses. (Technical Press Manuals, *cover series title.*)
2nd ed. 7¼″. viii+172 pp. Lond. : Technical Press. 1938. 6s. R.

GLEN (R. A.)
The Law of smoke nuisances. Revised ed. of The Law relating to smoke and noxious fumes, 1934. By W. R. Hornby Steer. (National Smoke Abatement Society.)
8½″. 65 pp. Lond. 1938. 1s., 2s. 6d. R.

BRITISH STANDARDS INSTITUTION
B.s.s. :—
No. 792 . . . for mild steel dustbins.
1938. 2s. R.

Review of Periodicals

Attempt is made in this review to refer to the more important articles in all the journals received by the Library. None of the journals mentioned are in the Loan Library, but the Librarian will be pleased to give information about price and where each journal can be obtained. Members can have photostat copies of particular articles made at their own cost on application to the Librarian.

Normally the journals referred to in this review, all of which are in the R.I.B.A. reference library, cannot be borrowed. Members are, however, asked to encourage their local public libraries and their local society's library to take as many journals as they can afford; and they are asked, for the convenience of local members, to notify the R.I.B.A. of what journals are known to exist in public or private hands in their own neighbourhood.

SCHOOLS

ARCHITECTURAL RECORD (NEW YORK). *1938. May. P. 120.*

A building types section on Schools. Examples of large American secondary schools accommodating 1,000-2,500 pupils and of elementary schools are included together with separate articles dealing with the principal plan elements—general, outdoor recreation, indoor recreation, assembly, dining, study and instruction.

UNIVERSITIES

R.I.B.A. JOURNAL. *1938. 9 May. P. 634.*

The new buildings for London University, a paper by the architect, Charles Holden [*F.*], followed by descriptive notes, with plans and photographs dealing with the completed portions of the group—the Senate House with assembly halls, common rooms, refectories and administrative offices; the Libraries and the stack rooms situated in the 200 ft. central tower and with the Institute of Education. Notes on construction and on heating and equipment are included.

ARCHITECT AND BUILDING NEWS. *1938. 20 May. P. 218.*

Queen Mary College, London University, the Lynden Hall residence for Women Students. Playne and Scott [*A. & F.*].

MUSEUMS AND EXHIBITIONS

BUILDER. *1938. 20 May. P. 983.*

ARCHITECT AND BUILDING NEWS. *1938. 13 May. P. 166.*

ARCHITECTURE ILLUSTRATED. *1938. May. P. 123.*

The Empire Exhibition, Glasgow. Illustrated commentaries on the buildings and general planning.

BOUWKUNDIG WEEKBLAD ARCHITECTURA (AMSTERDAM). *1938. 28 May.*

Competition designs for pavilion at the New York World Fair, 1939, including schemes by Dudok, Stam, Wijdeveld and others.

ARKITEKTEN (COPENHAGEN). *1938. No. 3. P. 33.*

Issue devoted to the new national museum by Mogens Clemmensen.

LIBRARY

ARCHITECT AND BUILDING NEWS. *1938. 27 May. P. 235.*

Harold Cohen Library, Liverpool University, by H. A. Dod [*F.*].

CIVIC

ARCHITECT AND BUILDING NEWS. *1938. 20 May. P. 203.*

BUILDER. *1938. 27 May. P. 1037.*

Manchester Town Hall extension, by Vincent Harris [*F.*].

ARCHITECTS' JOURNAL. *1938. 2 June. P. 940.*

THE BUILDER. *1938. 3 June. P. 1085.*

ARCHITECT AND BUILDING NEWS. *1938. 3 June. P. 264.*

Civic Halls, Wolverhampton, by Lyons and Israel [*A.A.*]. The building contains a large hall with organ for use by choral and musical societies and for important functions and a smaller hall with stage for amateur theatricals.

ARCHITECT AND BUILDING NEWS. *1938. 13 May. P. 184.*

Brentwood Police Station, by J. Stuart [*F.*].

ARCHITECT AND BUILDING NEWS. *1938. 27 May. P. 248.*

BUILDER. *1938. 27 May. P. 1041.*

New central fire station, Brighton, by G. I. C. Highet [*A.*].

OFFICES

ARCHITECT AND BUILDING NEWS. *1938. 27 May. P. 238.*

Government offices, Zurich. Two straightforward buildings, each with rooms arranged on both sides of a central corridor.

SHOPS

DESIGN AND CONSTRUCTION. *1938. May. P. 187.*

Stores, shops and showrooms. A reference section including articles on contemporary trends in shop planning, by A. E. Hammond, on recommended materials for shop-fitting and an article by E. Maxim on new shop-front developments. The buildings illustrated include a co-operative store in Edinburgh by T. P. Marwick & Sons [*A.*], a store at Leicester by Raymond McGrath [*A.*], and a furnishing company's store at Lewisham by C. J. Eprile.

L'ARCHITECTURE D'AUJOURD'HUI (PARIS). *1938. April. P. 3.*

A good section on shops and stores. Many illustrations of shop-fronts with diagrams showing how glare and reflection may be avoided. Most of the best modern department stores are illustrated.

R.I.B.A. JOURNAL. *1938. 23 May. P. 706.*

Shop lighting. Low tension fluorescent tubes in three colours give an almost exact daylight in a Croydon store by O. P. Bernard. [*L.*].

TRANSPORT

R.I.B.A. JOURNAL. *1938. 23 May. P. 690.*

ARCHITECTS' JOURNAL. *1938. 26 May. P. 894.*

BUILDER. *1938. 20 May. P. 1001.*

Reviews of Sir Charles Bressey's Highway Development Plan for London.

ARCHITECT AND BUILDING NEWS. *1938. 3 June. P. 272.*

Malden Manor S.R. station, by J. R. Scott.

HOSPITALS

ARCHITECT AND BUILDING NEWS. *1938. 13 May. P. 175.*

ARCHITECTS' JOURNAL. *1938. 26 May. P. 911.*

Nurses' Home, Royal Masonic Hospital, by Sir John Burnet, Tait & Lorne [*FF.*].

ARKKITEHTI (HELSINGFORS). *1938. No. 4. P. 49.*

Maternity hospital at Viipuri, Finland, by U. Ullberg.

SPORTS

R.I.B.A. Journal. *1938. 23 May. P. 681.*

The Amsterdam Boschplan. The planning and planting of a large recreational park, including woods, meadows, boat-race course (2,400 yards), yachting lakes, sports grounds, riding and cycling tracks, etc., etc. The general plan, grand-stand, boathouses and changing rooms for eights, and a sports pavilion are illustrated by plans and photographs.

Builder. *1938. 27 May. P. 1045.*

Winning design in competition for a bathing establishment at Dun Laoghaire, Eire, by J. R. Boyd-Barrett [*A.*].

Builder. *1938. 3 June. P. 1081.*

Extension to the Ladies Carlton Club by Darcy Braddell [*F.*] and Deane. The new building contains additional bedrooms, squash courts and changing rooms.

Architectural Record (New York). *1938. May. P. 74.*

Large community centre at Hibbing, Minnesota, including an arena which can be used as an ice rink and providing recreational facilities of all types.

Covered sports arena at Cleveland, seating for 12,500, by Warner & Mitchell.

Das Werk (Zürich). *1938. May. P. 142.*

Clubhouse for sailing club, Zürich ; a delightful building by L. M. Boedecker, consisting of changing rooms and boat-houses with caretaker's rooms, kitchen, club room and veran-dah above.

CINEMAS AND FILM STUDIOS

L'Architecture d'Aujourd'hui (Paris). *1938. April. P. 32.*

A 50-page section dealing with the problems of film studios and their accessory services. The location and planning requirements of the ideal studio are dealt with. French studios are fully illustrated. English studios include those at Denham by Messrs. Joseph and at Shepperton by Messrs. Connell, Ward & Lucas and the Pinewood studios. Many foreign examples are also given.

Pencil Points (New York). *1938. May. P. 337.*

The requirements of the projection room in the design of the cinema.

STUDIO

Architectural Record (New York). *1938. May. P. 62.*

Artists' studio at the London Zoo by Lubetkin and Tecton.

RELIGIOUS

Architects' Journal. *1938. 2 June. P. 953.*

Church hall at Watford, Herts, by Welch & Lander [*FF.*]. Part of the building forms a sanctuary used for worship only and can be shut off by large sliding doors from the main hall.

R.I.B.A. Journal. *1938. 23 May. P. 706.*

Church lighting. The relighting of Brompton Oratory, by Waldo Maitland [*A.*].

Architect and Building News. *1938. 3 June. P. 279.*

Builder. *1938. 3 June. P. 1092.*

Winning design in a competition for a crematorium near Oxford, by H. R. W. Orr.

The Malayan Architect (Singapore). *1938. April. P. 77.*

Mosque for the Malay Regiment, by F. Dorrington Ward [*F.*].

DOMESTIC AND HOUSING

Builder. *1938. 27 May. P. 1033.*

Fountain House : Luxury flats, garage and shops in Park Lane, W., by Val Myer and Watson Hart [*FF.*].

Architect and Building News. *1938. 20 May. P. 210.*

Stockleigh Hall, Regent's Park. A block of luxury flats awarded the R.I.B.A. London Architecture Medal, 1938. Architects : Robert Atkinson and A. F. B. Anderson [*FF.*]. Also, by Robert Atkinson, Oslo Court, Regent's Park.

Design and Construction. *1938. May. P. 179.*

Flats. A practical digest of essentials in planning, equipment and finishings by F. Gibberd.

Architect and Building News. *1938. 3 June. P. 275.*

A small apartment building in Chicago, by Ribori and Miller. An aggressively modern design with contrasting areas of brickwork and glass blocks.

Architectural Forum (New York). *1938. May. P. 345.*

An important 80-page survey of Government housing prob-lems and policy in the United States. The evolution of housing legislation, culminating in the recent setting up of the U.S.H.A. after the Housing Act of September 1937, is traced in an interesting leading article. Many illustrations of completed schemes are included together with plans, grouped for easy comparison, of typical flat and house units.

Builder. *1938. 20 May. P. 995.*

Architects' Journal. *1938. 2 June. P. 956.*

Rehousing scheme, Union Street, Southwark, by E. Arm-strong [*A.*]. Seven blocks of four and five storey flats.

Builder. *1938. 3 June. P. 1098.*

Construction of flats for working classes. L.C.C. comments on departmental committee's report.

Pencil Points (New York). *1938. May. P. 281.*

New York housing. An article by Talbot Hamlin on the Harlem River Homes and the huge Williamsburg Develop-ment.

CONSTRUCTION

Architectural Record (New York). *1938. May. P. 101.*

An article on long span construction giving flexibility and freedom from structure limitations in such buildings as factories and airplane hangars.

MATERIALS

Architectural Record (New York). *1938. May. P. 92.*

Residential construction with plywood. Examples of the application of the recently developed material with resinous binders which make the plywood suitable for external use.

EQUIPMENT

Architects' Journal. *1938. 19 May. P. 823.*

Silence. A special issue devoted to the control of noise. Articles : The position to-day, by K. M. Constable. Present methods of sound measurement, by A. H. Davis. Particulars are given of the technical defence against noise in an office building by S. Chermayeff [*F.*], and in flats by F. Gibberd, and another article deals with the sound insulation of walls, doors, windows and floors. Noise research, sound conduction, absorbing materials, quiet equipment, the reduction of machinery noise and silent water and ventilation services are also dealt with.

A.R.P.

Design and Construction. *1938. May. P. 173.*

Civil defence IV.—The requirements of and fittings for an average sized air-raid shelter.

Correspondence

A MEMORIAL TO SIR GUY DAWBER

Council for the Preservation of Rural England,
4 Hobart Place,
S.W.1.
23.5.38

To the Editor, JOURNAL R.I.B.A.

DEAR SIR,—Lady Dawber has received so many kind and appreciative letters on the death of her husband that she has asked the Council for the Preservation of Rural England to open a Guy Dawber Memorial Fund. The object is to perpetuate his name in connection with the work of the Council of which he was the founder. The proceeds of the fund will be used to promote that aspect of the work in which he was specially interested, namely, the improvement of rural housing.

I am asked to inform you that the Council will very much appreciate it if you can see your way to bringing this Memorial Fund to the notice of your members either through your JOURNAL or by some other appropriate means. Quite small sums will be welcomed as we would like to have a large number of recorded sympathisers in our effort.

Contributions should be sent to the Hon. Treasurer, the C.P.R.E., 4 Hobart Place, S.W.1, and should be marked " Memorial Fund."

Yours faithfully,
H. G. GRIFFIN,
Secretary

A HISTORY OF THE GRAVESTONE IN ENGLAND

9 Tanza Road,
Hampstead, London, N.W.3.
18.5.38

To the Editor, JOURNAL R.I.B.A.

SIR,—All members of this Institute are familiar with the diverse aspects of church architecture, the historical and social implications of which have been the subject of serious study and research throughout the whole of the last century.

It may be safely said that there are hardly any details of the church itself that have not been dealt with in general works, large detail publications, or small pamphlets. Without wishing to suggest that even this ground has been completely covered, witness H. Munro Cautley's recent book on the Suffolk churches as an example of what should be done in the case of each county, there is, however, one subject connected with the church that remains, so far as we have been able to ascertain, practically virgin ground for the research worker.

This concerns the church graveyard, with the monuments and tombstones of all types which it may contain. The wealth and variety of detail that has been bestowed upon memorials to the dead throughout the ages is a subject with which very few people are familiar. It is only necessary to visit a few old churchyards at random in any part of the country to realise the valuable and intensely interesting material that still withstands the ravages of time.

There are undoubtedly a considerable number of architects who have either photographed or made notes of outstanding stones that attracted their attention and admiration, in the course of their professional dealings with churches, or for their purely personal pleasure and interest.

The purpose of this letter is to ask any such members if they would be good enough to lend any notes or photographs (preferably negatives) of this nature to the undersigned for use in general research for a thesis on the " History of the Gravestone in England." In the event of any publication in the future, no use would be made of any of the illustrations so collected without the specific permission of the original owner.

It will be appreciated that the immense numbers of old church graveyards existing all over the country contain an overwhelming amount of material at the moment completely unrecorded, and that as each year passes large numbers of the older monuments fall victims to accidents, the careless disregard of incumbents, or the constant dilapidation caused by continuous exposure to the elements. Therefore, each stone that is carefully recorded may be regarded as a permanent addition to the knowledge of posterity, from which the character and customs of our forefathers may be read.

We are, Sir,
Yours faithfully,
BIRKIN HAWARD [*A.*]
FREDERICK BURGESS,
A.R.C.A.

SPECIFICATIONS PREPARED BY QUANTITY SURVEYORS

East Meon,
Hants.
24.5.38

To the Editor, JOURNAL R.I.B.A.

DEAR SIR,—The note on the subject in your last issue seems to call for some definite comment by the Practice Committee of the Institute. An architect's specification is only a description of his design. In most districts now, builders only estimate on quantities prepared by an independent surveyor if the work is of any size. The quantity surveyor is in close touch with the designer and gets his data for all details, not shown on the plans, in consultation. No plans, however elaborate, can show every detail of construction and if there must be quantities a competent specification is first written from (and indeed can only be accurate from) quantities. If an architect wants a specification written by an expert for work too small to require quantities he would no doubt expect to pay for such expert, safeguarding his own and his client's and, indeed, the builder's interests.

Yours faithfully,
P. MORLEY-HORDER [*F.*]

Obituaries

CHARLES EDWARD FOX, F.S.I. [*F.*]

We regret to record the death of Mr. C. E. Fox, of the firm of Messrs. Jackson & Fox, Halifax, who was well known for his work on rating and valuation.

He was born in New Bond Street, Halifax, on 21 January 1864, and was educated at Heath Grammar School. He was articled in 1881 to Mr. B. W. Jackson, who was in partnership with Mr. Fox's father, and was associated with the firm until his death.

The work of the firm was mostly in Yorkshire and Lancashire and included churches, schools, theatres, licensed property, private houses and factories. Mr. Fox was also quantity surveyor and valuer to many building societies and insurance companies and was surveyor to the Southowram Urban District Council from 1914 until its dissolution this year. He was also a Referee under the Finance Act, 1910, the Rating and Valuation Act, 1925, and the Landlord and Tenant Act, 1927. Mr. Fox was also President of the West Yorkshire Society of Architects from 1936 to 1937.

For nearly 50 years he was a Fellow of the Chartered Surveyors Institution and he was a member of the Yorkshire Geological Society, the Halifax Antiquarian Society and the Halifax Scientific Society, and was the founder of many prizes in boys' and girls' schools in Halifax. Mr. Fox was a keen and brilliant sportsman and played both Rugby football and hockey for Yorkshire.

The practice is being continued by his son, Lt.-Col. C. H. Fox, O.B.E., B.Sc., F.S.I., P.P.I.Struct.E., at 1 Harrison Road, Halifax.

P. W. HATHAWAY [*F.*]

Mr. Percy Hathaway, who died in March, was born in 1880 and was articled to Messrs. Bassett Smith in London. From 1899 to 1903 he was architectural assistant to the Barrow-in-Furness Corporation and later was first architectural assistant and then architect to the Rochdale Corporation (1903-1921), when he was appointed City Architect, Calcutta. In 1929 he returned to England and became architectural assistant to the Corporation of Nottingham. For a year before his death he was chief quantity surveyor to the Corporation.

Notes

BIRTHDAY HONOURS

The following members appear in the King's Birthday Honours list published on 9 June :—

M.B.E. (Military Division)

Captain James Bell, B.Sc. [*A.*], 52nd (Lowland) Divisional Engineers, Royal Engineers, Territorial Army.

O.B.E. (Civil Division)

Mr. William Henry Ludlow [*A.*], architect and surveyor, General Post Office, and Pestonji Phirozshah Kapadia [*F.*], architect, Bombay.

M.B.E. (Civil Division)

Mr. Charles Stewart Agnew, B.E., M.R.I.A.I., Senior Architect, Ministry of Finance, Northern Ireland, and Mr. George Frederic Turner [*L.*], for political services in South Oxfordshire.

PROFESSOR ABERCROMBIE, CHAIRMAN C.P.R.E.

Professor Patrick Abercrombie [*F.*] has been elected chairman of the Executive Committee of the Council for the Preservation of Rural England in the place of the late Sir Guy Dawber. Professor Abercrombie has been hon. secretary since the C.P.R.E.'s foundation in 1926.

SIR CHARLES BRESSEY, P.C.S.I.

Sir Charles Bressey, author of the recently published report on the Highway Development of Greater London, has been elected President of the Chartered Surveyors Institution.

MUSIC GROUP

A meeting of the Music Group will be held on 16 June at 5.30 p.m. All those interested in music at the R.I.B.A. are invited to be present.

VISIT TO THE NEW BUILDINGS OF LONDON UNIVERSITY

Arrangements have been made with Mr. Charles Holden for members of the R.I.B.A. to visit the new buildings of London University on 2 July. The party will meet in the entrance hall (entered under the Tower) at 2.30 p.m. The number is to be limited to 50.

Members who wish to take part are asked to make early application to the R.I.B.A.

A.I.A. GOLD MEDAL

The Gold Medal of the American Institute of Architects for most distinguished services to the architectural profession has been awarded to Paul Cret.

A.A.S.T.A. TRIP TO THE GLASGOW EXHIBITION

The A.A.S.T.A. is organising a trip to the Glasgow Exhibition, leaving London at 9.25 p.m. on Friday, 1 July, returning from Glasgow on Sunday 3 July at 10.30 p.m. On the Sunday, when the Exhibition will be closed, an excursion (6s. extra) will be arranged through some of the loveliest scenery in Scotland by Loch Lomond, Ben Lomond, Arrochar, Rest and Be Thankful, Loch Fyne and Inverary. Cost to A.A.S.T.A. members, £3 7s. 6d.; non-members £3 10s. Accommodation for men will be provided in Glasgow University Students' Hall. Women will be boarded out for 2s. 6d. extra. Apply Secretary, A.A.S.T.A., 113 High Holborn.

SCHOOL NOTES

ARCHITECTURAL WORK AT THE CENTRAL SCHOOL OF ARTS & CRAFTS

The work done by the students during the past year is now on exhibition at the Central School of Arts and Crafts in Southampton Row.

The Architectural School there is purely an evening school. Now that so many of the Architectural Schools have become a whole time business, the classes here fill a gap for the student who, while earning his living in an office, wants to improve his powers of design, or for the young man who has started life in a misfit occupation, and feels that architecture is his *métier*. Here in his spare time he can acquire skill in draughtsmanship and knowledge of design and construction, enough to enable him, in due course, to obtain a junior post in an architect's office, and place his foot on the bottom rung of the architectural ladder.

For these reasons alone the school is an important link in the scheme of architectural education, but it follows that the work to be shown is neither great in volume nor spectacular in presentation.

The work shown follows traditional rather than experimental lines. Those in charge of the school feel that the student who comes for short hours, and for a comparatively short period, can gain a better foundation in the sense of design by a sound knowledge of the traditional methods of English building than by attempts to design in the vogue of the moment, without that mastery of the inherent qualities of the material that should underlie a new architecture.

The range of the work shown is wide, as may be expected of students of varying ages and at varying stages of development. Every problem is given a sense of reality by being related to an actual site or to existing facts.

An ambitious subject is the remodelling of Victoria Station and its hotel, with its environs, so as to improve the traffic facilities in that part of London. The tackling alone of such a subject has meant much research. Railway managers and traffic experts have been interviewed. Railway and road traffic problems have been studied and the student has learned how to sort out and put in order the large number of complicated facts that have to be assembled before it is possible to start on the successful planning of a scheme of this magnitude. The resulting plans show a grasp of the essentials and the solutions are promising.

The designing of a library and picture gallery in a country town is another subject, and here the endeavour to express a picturesque and country atmosphere has obscured the clear and direct planning with which such a subject should be approached.

Through a series of village halls, one ranges down to small houses and cottages. The designs show varying points of interest, but among them one finds the fault so often made by students of introducing complications, both of planning and of construction. A *tour de force* then has to be attempted which could only be resolved by skill and experience far beyond that at the command of the student.

It should be realised that no clear design can be made until the designer has a clarity of mind as to the actual facts of his problem, and until he has marshalled these in their relative importance. If this were done, he would not plan his class-rooms under a roof high enough and of the same importance as that required for the hall itself; he would not put his lavatories into some space that he did not know what to do with, without any planning at all, or introduce galleries for effect, without any means of approach.

The student who learns that the simplest and most direct solution to his problem is almost certainly the best will have gone some way to being a good architect.

OSWALD P. MILNE [*F.*]

THE STUDENTS' VISIT TO ITALY 1938

Through the generosity of the R.I.B.A. and its Allied Societies twelve students from different parts of Great Britain and Ireland visited Italy last Easter to see at first hand buildings which they had only seen in photographs or heard about in school lectures. The tour included work of all periods, but most interest was shown in the modern architecture and planning.

Among the best modern buildings seen were the railway stations at Florence and Sienna and new post offices at Rome and Naples. The members of the party were particularly lucky to be taken over a new hospital just outside Rome by the architect, Signor Ettore Rossi, who made the visit most interesting. As guests of the Italian Ministry of Popular Culture, the students were taken by motor-coach to visit the work done by the Government on the Pontine Marshes, during which the new towns of Littoria and Sabaudia were seen. The work done here made such an impression on the visitors that it was decided to send a telegram of congratulations to Signor Mussolini, which was well received by the newspapers the next day: "The party of architects and artists from Great Britain who to-day have had the opportunity of visiting the work done on the Pontine Marshes wish to offer their congratulations upon the great work which has been done here by your Excellency."

The lighter side of the tour included visits to Vesuvius and the Isle of Capri, the latter rather spoilt by the tourist trade; also a 200-mile drive by car from Naples to the Greek Temples at Paestum, which were by far the most impressive ancient monuments seen. The return journey was made via the coastal road, visiting *en route* Salerno, Amalfi, and Sorrento. This route is considered to be one of the finest scenic drives in the world. Much of the success of the visit must be attributed to the programmes arranged and the interest taken in the visit by Mr. Radford (Director) and Mr. Tendall, both of the British School in Rome. In conclusion it can be said that every member of the party has greatly benefited by the visit. T. D. GEDRYCH

WELSH SCHOOL OF ARCHITECTURE

A lecture on "The Renaissance in Architecture" was given at the University College of South Wales and Monmouthshire on Friday, 6 May, by Mr. W. S. Purchon, Head of the Welsh School of Architecture, Cardiff Technical College.

The lecturer dealt first with Greek and Roman architecture, in order to give some indication of the nature of the art which was "reborn." After speaking on Romanesque, which he described as an earlier Renaissance, and showing how Gothic steadily developed, he proceeded to deal with the early days of the Renaissance in Florence and with its spread to other parts of Italy, France and England. He also referred to the Classic and Gothic revivals of the 19th century and indicated their effect on modern architecture.

The lecture, which was profusely illustrated by lantern slides, was given to a large gathering of university students, most of whom were studying history as a degree subject. The lecturer was thanked by Professor Rees, Professor of History in the University of Wales, who drew attention to the value of such lectures in providing a background to the study of history.

Notices

THE TWELFTH GENERAL MEETING MONDAY, 20 JUNE 1938, AT 8 P.M.

The Twelfth General Meeting of the Session 1937-1938 will be held on Monday, 20 June 1938, at 8 p.m. for the following purposes :—

To read the Minutes of the One Hundred and Fourth Annual General Meeting held on 9 May 1938 ; formally to admit new members attending for the first time since their election.

To read the report of the Scrutineers appointed to examine the voting papers for the election of the Council for the Session 1938-1939.

Informal Discussion on Matters of Professional Interest

At the conclusion of the above General Meeting there will be an informal and private discussion on matters of current professional interest or concern. Members are invited to bring up for discussion, with or without notice, subjects of professional interest or difficulty.

APPOINTMENT OF R.I.B.A. COMMITTEES FOR THE SESSION 1938-1939

Members are invited to submit for consideration by the Executive Committee and Council suggestions for the personnel of the various Committees for the Session 1938-1939. Lists of the present Committees will be found on pages 20 to 29 of the current issue of the Kalendar.

EXHIBITION OF DESIGNS SUBMITTED IN THE COMPETITION FOR ST. ANDREW'S CATHEDRAL, SYDNEY, N.S.W.

The 30 designs submitted in the St. Andrew's Cathedral, Sydney, competition will remain on exhibition in the Henry Florence Hall until Wednesday 15 June between the hours of 10 a.m. and 8 p.m.

The result of the competition was announced in the Journal of 10 January 1938.

THE R.I.B.A. KALENDAR, 1938-1939

The attention of members is drawn to the leaflet enclosed with the issue of the Journal for 23 May. Changes of address, etc., for inclusion in the forthcoming issue of the Kalendar should be notified to the Secretary R.I.B.A. before Saturday, 2 July 1938.

BRITISH ARCHITECTS' CONFERENCE, BRISTOL, 22-25 JUNE 1938

Final arrangements for all the events of the Conference are now being made. It is hoped that all members and students who have not already done so will at once refer to the programme sent to them with the issue of the Journal for 25 April 1938 and send in their names without delay for such of the events as they desire to take part in.

Members of the R.I.B.A. and the Allied Societies who are officials of local authorities will be cordially welcomed as delegates to the Conference.

It is expected that there will be a large attendance of members from all parts of the country and they are urgently requested to arrange for their hotel accommodation at the earliest possible date so as to avoid the risk of disappointment.

PROFESSIONAL ADVERTISING

The attention of the Practice Standing Committee has been drawn to the fact that the publishers of certain journals are approaching architects for details of their professional activities, which the publishers propose to embody in the editorial columns of their journals. In the case of one particular firm of publishers, several members forwarded to the Institute the proposed article as drafted by the editor and sent to the architects for any additions or amendments the architects desire. In each case the wording of the articles is identical, with the exception of the names and addresses of the firms of architects to whom they were sent.

The Committee desire to warn members generally against this undesirable form of publicity. The acceptance by members of invitations of this nature from firms of publishers is, in the opinion of the Committee, directly contrary to the Code of Professional Practice and tantamount to advertising.

ASSOCIATES AND THE FELLOWSHIP

Associates who are eligible and desirous of transferring to the Fellowship are reminded that if they wish to take advantage of the election to take place on 24 October 1938 they should send the necessary nomination forms to the Secretary R.I.B.A. not later than Saturday, 2 July 1938.

LICENTIATES AND THE FELLOWSHIP

The present regulations governing the examination of Licentiates who, being otherwise eligible, wish to qualify for admission as Fellows provide that in the first place the candidate shall submit for approval by the Council working drawings of one or more of his executed buildings, supplemented by photographs and by original sketches or measured drawings of actual work, and—

(1) should the work so submitted be, in the opinion of the Council, of sufficient merit to exempt the candidate from further examination, he may be so exempted :

(2) if the work submitted is approved by the Council the candidate is required to submit himself to an examination ;

(3) if the work so submitted is, in the opinion of the Council, inadequate, his application is not further entertained.

By a resolution of the Council passed on 4 April 1938, on and after 1 January 1939 all candidates whose work is approved will be required to sit for the examination, which will be the design portion of the Special Final Examination, and no candidates will be exempted from the examination.

NOTE.—The above resolution will not affect Licentiates of over 60 years of age applying under Section IV, Clause 4 (c) (ii) of the Supplemental Charter of 1925.

CESSATION OF MEMBERSHIP

Under the provisions of Byelaw 21, the following has ceased to be a member of the Royal Institute :—

As Associate :

Oscar Alexander Beattie.

Competitions

The Council and Competitions Committee wish to remind members and members of Allied Societies that it is their duty to refuse to take part in competitions unless the conditions are in conformity with the R.I.B.A. Regulations for the Conduct of Architectural Competitions and have been approved by the Institute.

While, in the case of small limited private competitions, modifications of the R.I.B.A. Regulations may be approved, it is the duty of members who are asked to take part in a limited competition to notify the Secretary of the R.I.B.A. immediately, submitting particulars of the competition. This requirement now forms part of the Code of Professional Practice in which it is ruled that a formal invitation to two or more architects to prepare designs in competition for the same project is deemed a limited competition.

ADWICK-LE-STREET : NEW COUNCIL OFFICES

The Urban District Council of Adwick-le-Street invite architects whose offices are situated in the West Riding of Yorkshire to submit in competition designs for new Council Offices.

Assessor : Mr. John C. Procter, M.C. [*F.*].

Premiums : £50, £40 and £30.

Last day for submitting designs : 30 August 1938.

Last day for questions : 23 April 1938.

Conditions of the competition may be obtained on application to Mr. C. R. Marshall, Clerk to the Adwick-le-Street Urban District Council, Bank Chambers, High Street, Doncaster. Deposit £1 1s.

BRIERLEY HILL, STAFFS. : NEW MUNICIPAL BUILDINGS

The Brierley Hill Urban District Council invite architects of British nationality to submit in competition designs for new Municipal Buildings.

Assessor : Mr. Verner O. Rees [*F.*].

Premiums : £250, £150 and £100.

Last day for submitting designs : 30 November 1938.

Last day for questions : 30 June 1938.

Conditions of the competition may be obtained on application to Mr. F. Oakes, Clerk to the Brierley Hill U.D.C., Council Offices, Moor Street, Brierley Hill, Staffs. Deposit £2 2s.

ILKESTON : BATHS, GYMNASIUM AND FIRE STATION

The Council of the Borough of Ilkeston invite architects of British nationality to submit, in competition, designs for a Community Centre, comprising Public Baths and Gymnasium, and for a Fire Station.

Assessor : Professor Lionel B. Budden [*F.*]

Premiums : £200, £100 and £50.

Last day for submitting designs : 14 September 1938.

Last day for questions : 14 June 1938.

Conditions of the competition may be obtained on application to the Town Clerk, Town Hall, Ilkeston. Deposit £1 1s.

METROPOLITAN POLICE STATION, MARYLEBONE ROAD

The Receiver for the Metropolitan Police District invites architects of British nationality and resident in the United Kingdom to submit in competition designs for a new Police Station proposed to be erected on a site in Marylebone Road.

Assessors : Mr. G. Mackenzie Trench, O.B.E., F.S.I. [*F.*].
Mr. S. Rowland Pierce [*F.*].

Premiums : £300, £200 and £100.

Last day for submitting designs : 12 August 1938

Last day for questions : 1 June 1938.

Conditions of the competition may be obtained on application to the Receiver for the Metropolitan Police District, New Scotland Yard, London, S.W.1. Deposit £1 1s.

ST. GEORGE'S HOSPITAL : RECONSTRUCTION

The President, Vice-President, Treasurer and Governors of St. George's Hospital invite architects practising in the United Kingdom and Northern Ireland to submit in competition designs for the reconstruction of St. George's Hospital, Hyde Park Corner.

Assessors : Dr. H. V. Lanchester [*F.*].
Mr. T. A. Lodge [*F.*].

Premiums : £500, £300 and £200.

Last day for submitting designs : 30 August 1938.

Last day for questions : 1 March 1938.

Conditions of the competition may be obtained on application to The House Governor, St. George's Hospital, Hyde Park Corner, London, S.W.1. Deposit £2 2s.

YEOVIL : NEW TOWN HALL AND MUNICIPAL BUILDINGS

The Yeovil Borough Council invite architects to submit in competition designs for new town hall, municipal offices, public library and museum.

Assessor : Mr. C. Cowles-Voysey [*F.*].

Premiums : £200, £150, £100 and £50.

Last day for submitting designs : 30 June 1938.

Last day for questions : 15 March 1938.

COMPETITION FOR TWENTY HOUSES ON THE KINGSTON BY-PASS

Messrs. Wates, Ltd., invite architects of British nationality to submit in competition designs for a development scheme for twenty houses in a prominent position on the Kingston By-pass, New Malden, Surrey.

Assessors : Mr. Louis de Soissons, O.B.E. [*F.*]
Mr. C. H. James, A.R.A. [*F.*].
A Director of Messrs. Wates, Ltd.

Prizes : £75, £50 and £25.

The successful architect will be paid in addition the R.I.B.A. scale fee up to £65.

Last day for receiving designs : 18 July 1938.

Last day for questions : 4 June 1938.

Conditions of the competition may be obtained on application to Messrs. Wates, Ltd., 1258-1260 London Road, Norbury, London, S.W.16.

COMPETITION FOR DESIGNS FOR BRICK FIREPLACES OR FIRE SURROUNDS

Messrs. Dunbrik, Ltd., invite architects and architectural students in Great Britain to submit in competition designs for five fire-places and surrounds.

Assessors : Mr. Howard Robertson [*F.*].
Mr. G. A. Jellicoe [*F.*].
Mr. Brian O'Rorke [*A.*].

Premiums : £50, £25 and £10.

Last day for sending in designs : 31 July 1938.

Conditions of the competition may be obtained on application to Messrs. Dunbrik Ltd., 46-47 Chancery Lane, London, W.C.2.

FORTHCOMING COMPETITIONS

Other competitions which it is proposed to hold, and the conditions for which are not yet available, are as follows :—

BRIGHOUSE : NEW MUNICIPAL BUILDINGS
Assessor : Mr. James R. Adamson [*F.*].

COSELEY, STAFFS : NEW SCHOOL
Assessor : Mr. A. C. Bunch [*F.*].

EDMONTON : NEW TOWN HALL BUILDINGS
Assessor : Mr. E. Berry Webber [*A.*].

GODALMING : NEW MUNICIPAL BUILDINGS
Assessor : Mr. Stanley C. Ramsey [*F.*].

GLOUCESTER : NEW SWIMMING BATH AND FIRE STATION
Assessor : Mr. C. F. W. Dening, R.W.A. [*F.*].

METROPOLITAN EAR, NOSE AND THROAT HOSPITAL : RECONSTRUCTION
Assessors : Messrs. Charles Holden [*F.*] and Lionel G. Pearson [*F.*].

NEWCASTLE-UPON-TYNE : NEW MUNICIPAL BUILDINGS
Assessor : Mr. Verner O. Rees [*F.*].

OLDHAM : ELECTRICITY OFFICES AND DEPARTMENTAL BUILDINGS
Assessor : Professor R. A. Cordingley [*F.*].

SHREWSBURY : NEW SENIOR SCHOOL
Assessor : Mr. C. Cowles-Voysey [*F.*].

SOUTH SHIELDS : ASSEMBLY HALL AND LIBRARY
Assessor : Mr. Arthur J. Hope [*F.*].

WREXHAM : NEW TOWN HALL
Assessor : Mr. Herbert J. Rowse [*F.*].

COMPETITION RESULTS

DUNDEE : DUNCAN OF JORDANSTONE COLLEGE OF ART

1. Mr. James Wallace [*L.*] (Cardiff).
2. Mr. Donald D. Harrison [*A.*] (Watford).
3. Messrs. W. E. Mellon and Hubert E. Furse (London).

DUN LAOGHAIRE, I.F.S. : NEW BATHING ESTABLISHMENT

1. Mr. J. R. Boyd-Barrett [*A.*] (Cork).
2. Mr. Dermot O'Toole (Dublin).
3. Messrs. T. P. Kennedy and G. McNicholl (Dublin).

Commended : Messrs. L. O'Callaghan and L. F. Giron (Dublin).
Messrs. Delap and Waller (Dublin).

OXFORD : NEW CREMATORIUM

1. Mr. Harold Orr (Bletchley).
2. Messrs. Burgess, Holden and Watson [*A. & L.*] (Beaconsfield).
3. Messrs. Crick and Townsend (Caversham).

SCOTLAND : DESIGNS FOR RURAL COTTAGES

Section 1. 1. Mr. J. A. Tweedie and Mr. P. M. Thompson [*A.*] (Edinburgh). *Section 2.* 1. Mr. Archie G. Paton [*A.*] (Dundee). *Section 3.* 1. Mr. Archie G. Paton [*A.*] (Dundee). *Section 4.* 1. Mr. Samuel McColl [*A.*] (Paisley). *Section 5.* 1. Mr. J. A. Tweedie and Mr. P. M. Thompson [*A.*] (Edinburgh).

MEMBERS' COLUMN

Owing to limitation of space, notices in this column are restricted to changes of address, partnerships vacant or wanted, practices for sale or wanted, office accommodation, and appointments vacant. Members are reminded that a column in the Advertisement Section of the Journal is reserved for the advertisements of members seeking appointments in architects' offices. No charge is made for such insertions and the privilege is confined to members who are definitely unemployed.

PRACTICE FOR SALE

PRACTICE in East Kent for sale, established 10 years, average income for the past 3 years over £800. Present staff will remain and supervision of the principal only is required. Low administrative costs, and practice capable of extension. Price, including furniture and equipment, £1,200.—Apply Chas. Clementson and Co., Chartered Accountants, 34 Pencester Road, Dover.

NEW PARTNERSHIPS

MESSRS. CAMPBELL & HONEYBURNE [*FF.*], of Bluecoat Chambers, School Lane, Liverpool, have taken into partnership Mr. B. A. Sumner, Dip.Arch.Liverpool [*A.*].

MR. R. S. ANDREWS, of 135 Bow Road, London, E.3, has taken into partnership Mr. Arthur H. Gale [*A.*]. The practice will be carried on at the same address and the style of the firm will be Andrews & Gale.

MR. W. E. JEFFERISS [*L.*] has entered into partnership with Mr. E. H. Stodart, formerly practising as E. H. Stodart & Company, at 21 Bedford Row, W.C.1, and the firm will in future be known as E. H. Stodart and Jefferiss, of that same address.

NEW PRACTICE

MR. W. A. CESSFORD BALL [*A.*], who has for the last five years been architect to Messrs. Roy Gibson, Ltd., of Putney, is commencing in practice at "Grantham House," Putney Heath, S.W.15, telephone: Putney 5624. He will still act in a consultative capacity for Messrs. Roy Gibson, Ltd.

PARTNERSHIP WANTED

A.R.I.B.A., A.A.Dip., 36, with sound general experience, interested in the surveying and legal side of practice and particularly interested in town planning, wants partnership with established architect. Capital available and small amount of work in hand. Reply Box 3158, c/o Secretary R.I.B.A.

ASSISTANT WANTED

REQUIRED for Malaya, a fully qualified and experienced Architectural Assistant. Must be a good designer and able to take complete control of all classes of work. Age not more than 35 years. Salary £600 per annum. Usual terms for services abroad.—Apply Box 3638, c/o Secretary R.I.B.A.

CHANGES OF ADDRESS

MR. R. J. HERSCH, M.A. [*A.*], has changed his business address to 66-68 Haymarket, S.W.1. Tel. No. Whitehall 6807/8.

MR. A. W. G. LOWTHER [*A.*], has moved his office to 13 Gray's Inn Square, W.C.1. Telephone: Chancery 7267.

MR. EDWARD FINCHAM [*A.*] has moved his office to 9 Palmer's Avenue, Grays, Essex.

MISS HELEN B. BLAKER [*A.*] is now in practice at The Broadway, Farnham Common, Bucks.

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R.I.B.A. JOURNAL

DATES OF PUBLICATION. — 1938; 27 June; 18 July; 15 August; 12 September; 17 October.